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734

Auto motive industries.

THE AUTOMOBILE

WEEKLY

NEW YORK—THURSDAY, JANUARY 2, 1908—CHICAGO

10 CENTS

WINTON



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The Winton Six-Teen-Six
is *the* six-cylinder car. Does every-
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and didn't find. Combines the sweet-
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steam, and goes the route like

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Carriage Company

Member A. L. A. M.
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THE SISTER
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MAJA

Pronounced "My-yah"



THE SISTER
OF
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Is the latest improved product of the Daimler Motoren Gesellschaft, makers of the Mercedes Cars, named by Herr Jellinek for his daughter, Miss Maja Jellinek, just as he named his earlier model for Miss Mercedes Jellinek. The Maja Motor is the simplest, most powerful for size, and the quietest in the world, exhibiting features that will as surely advance the art of motor car making as did the previous revolutionary productions of these famous Works. For 1908 these advantages are to be had only by using a Maja Car. The Maja Car is placed within reach of all lovers of good automobiles by marketing through direct branches of the parent Company, avoiding all middlemen and agents, charging one normal profit over the expenses of manufacturing, whereby the most costly models the Daimler Works have ever made become the lowest in price to the purchaser. Full particulars from the

American Branch of the Maja Company, Ltd., 230 W. 58th St., New York (Tel. 1393 Columbus)

OTHER OFFICES AND BRANCHES:

LONDON

PARIS

STUTTGART

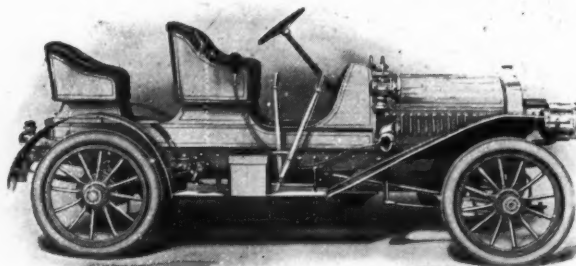
HAMBURG

ST. PETERSBURG

You are invited to attend "Maja's" debut at the Importers' Automobile Salon, open until January 4th, at Madison Square Garden. As is befitting, "Maja" has been assigned the leading position in the Show, immediately at the left of the main entrance, Space A-1.

The **World's Record**
Sealed Bonnet **Mora**
MECHANICALLY RIGHT.

Racytype
Four



Racytype
Four

Finest Light Four Built in America

The Gentleman's Ideal Easy Riding Roadster.

With double ignition \$2350. With single ignition, \$2050.

Furnished also with sloping back box body instead of rumble seat



MORA MOTOR CAR CO.

18 MORA PLACE

NEWARK, N. Y., U. S. A.



THE AUTOMOBILE

Importers Display Foreign Cars in Artistic Style

CREDIT for the most artistic setting of any automobile show held in New York this or probably any other year must unreservedly be given to the exhibition opened in Madison Square Garden on Saturday, December 28, by the Importers' association. Though officially designated the "Fourth Annual Importers' Salon," it is somewhat difficult to understand how the event can claim to be in more than its second year, the only other independent exhibition having been held with small success on the upper floor of a department store. Both New York shows, in which the Importers had taken some part in past years, were this season held so early that it was impossible for the foreigners to secure their new models in time for exhibition. By agreement with the Association of Licensed Automobile Manufacturers, which has an option on Madison Square Garden, the Importers were offered the big building from December 28 to January 4, and so another attempt was decided upon to attract the attention of the public on independent merit.

Frankly, the Importers have succeeded in what was avowedly a difficult position, the spectacle revealed to the public when the doors of the Garden were thrown open at 8 o'clock on Saturday night last being an agreeable surprise. In place of the Garden of the busy A. L. A. M. show an entirely new scene had appeared, the big amphitheater being transformed and decorated as probably it never had been before. The extra space available through the comparatively small number of exhibits gave the decorators an opportunity they have not failed to take advantage of, the big hall being treated in a manner that would hardly be possible with a more compact tenancy. Under the canopied ceiling an artistic decorative scheme in French renaissance style has been carried out with an attention to detail that leaves little at which the critical can point a finger. A central alley flanked by two side avenues, all terminating in a luminous fountain supposed to represent a scene at the Park Monceau, Paris, forms



the general scheme of the outlay, cars being displayed at their stands down these three alleys, and the first gallery given over to accessory exhibitors. The upper gallery supplies a promenade from which an excellent view is available of the scene below. The arena space is a decorative wall reaching to an elevated platform at the back of which rises a series of arches as high as the upper gallery, surmounted by open panels decorated with coats-of-arms at the edge of the roof. Except a deep blue sign showing the name of the firm, the column supporting it having a luminous base, there are no stand decorations, yet the lighting is of such a satisfactory nature as to throw out in best relief the models on show. The concert hall forms a tea garden with natural flowers as decorations.

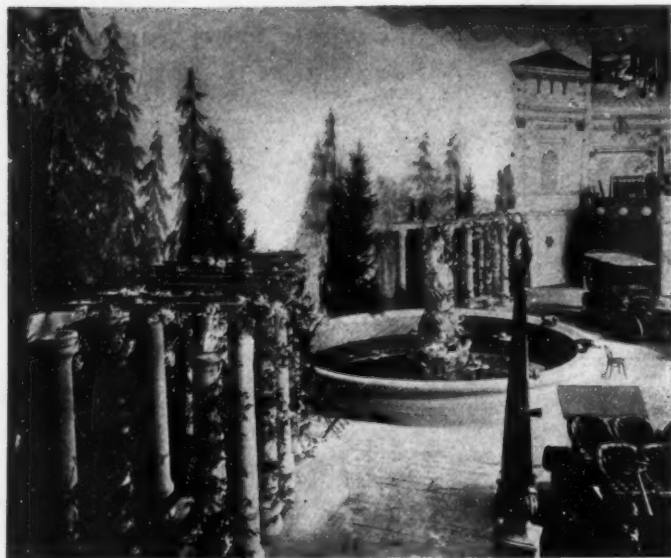
From the standpoint of business transactions there is more

room for diversity of opinion than regarding the general decorative effect of the show. Decorations will attract crowds, but decorations alone will not sell cars, and it is by this latter standard that every exhibition must finally be judged. Opening with a very thin house, the attendance during Saturday evening gradually increased until at 9 o'clock, though the hall was not crowded, there was an entirely satisfactory attendance, the foreign chauffeur element no longer being in a majority.

A Select Number of De Luxe Builders.

Eighteen firms were represented in the Garden at the opening hour: France supplying ten, Germany three, Italy three, England and Switzerland, one each. Darracq and Itala, both announced as exhibitors, were not to be found, but Züst and Benz, whose names had not appeared on the original lists, were represented by a car each. Though all the models were announced to have been imported direct from the Paris show, there are three or four cases that look suspiciously like 1907 models painted to resemble the models of the coming season.

CANCELLED
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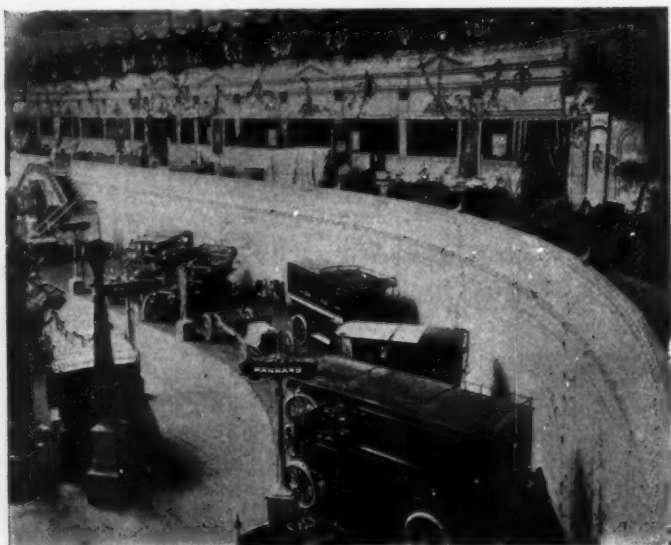


Those who had received new cars have in several cases been unable to get all their most interesting models over in time, as for instance, on the Delaunay-Belleville stand, where the smaller six-cylinder car, with its cylinders in two groups of three—one of the novelties of the Paris exhibition—is not to be seen. Dietrich's chief novelty at the Paris exhibition, a shaft-driven town vehicle, is also a missing quality. Renault, on the other hand, possesses a most complete line, which if not including every type of vehicle built at the Billancourt factory, at any rate comprises all those of interest to an American public, and that is saying a great deal.

It was not to be expected of an importers' exhibition, working under a 45 per cent. import duty, that popular vehicles would be in evidence to any extent. Practically all the cars shown are powerful models with a respectable number of figures attached to their names on the price lists; a limited exception is to be found in the town vehicles of half a dozen firms, with a power rating at something below twenty. In the examples of bodywork, too, shown by three American makers, the same high-grade article is exhibited of a nature to interest only those able to pay for the best.

Show Does Not Indicate Trend of Design.

Being a trade exhibition pure and simple, the Importers' Salon is valueless as an indication of the trend of design or methods of construction of any country; even the ten French firms, important as they are, cannot claim to adequately represent their



country's national industry, and the same is true to a greater extent of the models shown from Italy, Germany, Switzerland and England.

Special chassis for town work form the outstanding feature of the exhibition, widely differing but interesting models being shown by Panhard, C. G. V., Fiat, Hotchkiss, Renault, Maja and Delahaye. A low, side entrance body, easy steering, turning and control, and a silent engine are in general the features which European constructors have set themselves to develop for the special types of gasoline cars which in their own countries have almost driven out the electric as a town conveyance.

With the exception of the little Delahaye, fitted with a two-cylinder engine, all the town vehicles have four-cylinder engines, and all without exception have final drive through propeller shaft and rear live axle.

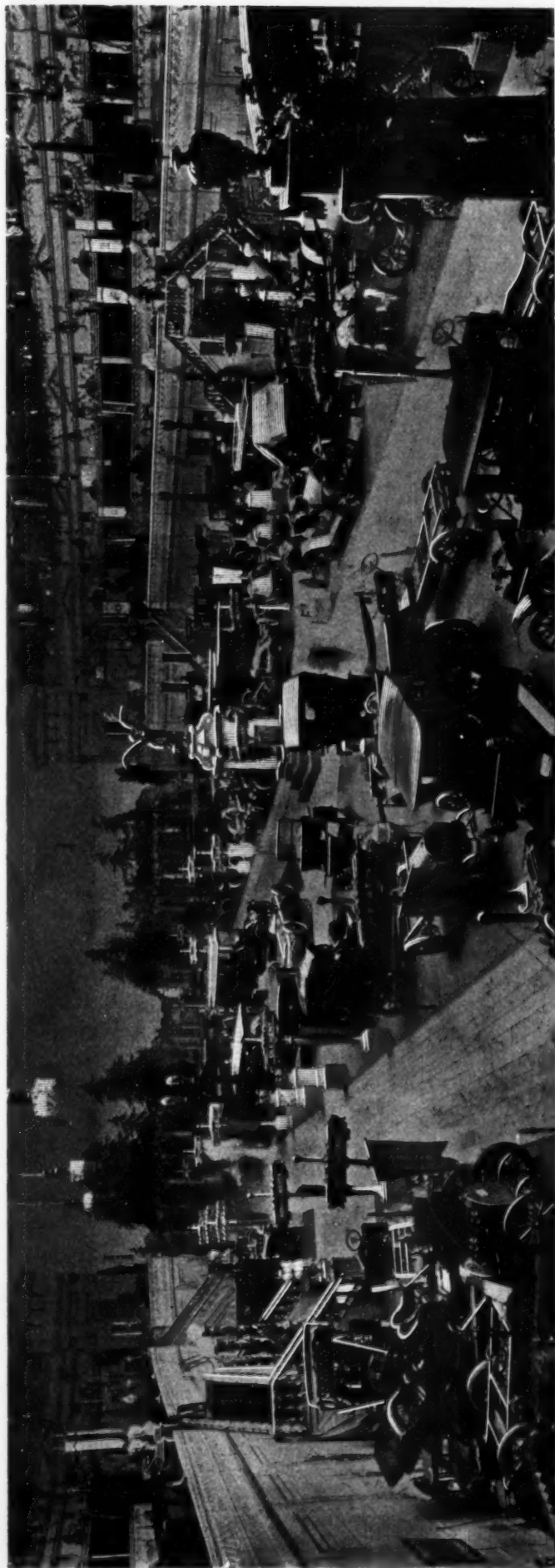
There is an interesting example of casting *en bloc*, so popular with makers of town vehicles desiring compact power plants, in the new 16-20-horsepower Hotchkiss, which Manager J. J. Mann, foreign technical adviser to the A. A. A. Racing Board, had brought over with him from Paris and was never tired of explaining to visitors. With valves on one side, all piping, both inlet and exhaust, has been cast as an integral part of the engine, the exhaust being arranged in such a way that on looking at the engine it is at first difficult to see what becomes of the spent charges from the engine. This is explained by the fact that the inclosed exhaust pipe opened at the rear of the last cylinder, the piping passing through the dashboard and connecting immediately to the engine. The arrangement of the inlet piping, or rather its absence, is a distinctive feature, the only connection being a short length of pipe from the carburetor to the engine. As the carburetor is on the opposite side to the valves, the charge is led across and distributed to the valves by internal piping. The consequence of such an arrangement is an extreme simplification of the engine, the water inlet and outlet and metal casing containing the wires being the only piping. It is interesting to note that unless specially ordered the Hotchkiss people no longer fit ball bearings in the engine, the abandonment being rendered necessary owing to careless handling on the part of inexperienced or careless drivers and owners.

The only other example of four cylinders in one casting is in the C. G. V. town vehicle, where valves are also all on one side, but in which more standard design is followed. A feature, however, is an asbestos-lined metal casing around the exhaust manifold.

Self-starter on Renault Town Car.

Renault presents no particular model which by reason of outstanding features can be termed a town vehicle, there being a close similarity in points of construction between the smallest and the largest of the cars built by this firm, but the 10-14-horsepower four-cylinder model possesses such qualities of silence, flexibility and compactness as to have earned for it the title of Queen in its class. No distinctive changes are noticeable on the engine of this model, the cylinders as before being cast in pairs, with valves on one side, magneto in front, and tubular radiator on the dashboard.

Among the new features of the chassis will be immediately noticed an additional pedal to the left of the clutch pedal, by simply depressing which the motor can be started up from the seat. An attempt to solve the problem of self-starting was presented by Louis Renault at the Paris Salon two years ago, the device of that date having but little in common with the arrangement now in use on the smaller Renault cars. All the mechanical parts connected with the self-starter are contained in a compact metal case mounted on the gear box, in such a way as not to interfere with the opening of this organ. The arrangement appears to be eminently simple, necessitates no change whatever on the engine, and should have a longer reign of usefulness than some of the self-starters which, conspicuous on 1907 models, are absent on the corresponding models for 1908.



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Three-quarter elliptic springs are to be a feature of all Renault four-cylinder models for 1908, and wherever desired patent shock absorbers designed by Louis Renault will be fitted front and rear. Since the adoption of three-quarter elliptic springs the rear construction of the chassis has been slightly changed, the broad angle stays being abandoned for smaller semicircular binders, having a much neater appearance. The new type of suspension is declared to be more steady, to cause less rolling with heavy bodies and to twist the chassis less than the platform type, which was formerly a standard feature.

Panhard's Shaft-driven Car.

Panhard's first shaft-driven car—other than racers—is too solidly constructed for its usefulness to be confined solely to service over well paved town streets. Yet it has been designed especially to meet the demand for a silent car suitable for work in cities. The car is an entirely new production, departing considerably from Panhard practice in both engine and transmission. The four cylinders are cast separately and are approximately 3 1-2 by 5 1-8, rated at 15-20-horsepower at 1,300 revolutions.

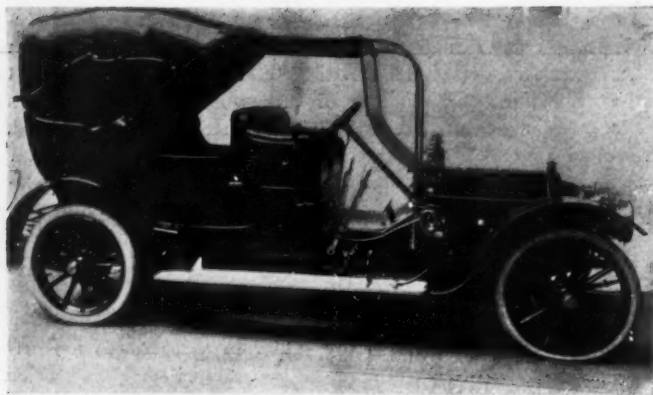
Most prominent in the engine design is the sliding exhaust valve camshaft operated by a foot pedal, by means of which the engine can be used as a brake. The same arrangement is to be found on the larger models, thus giving for Panhard cars three independent sets of brakes. Both camshafts are contained in the upper part of the crankcase and are removable from the rear by disconnecting a detachable disk. Gear set and multiple-disk clutch are contained in one housing set rather more to the rear than usual. The engine flywheel is fitted with fan blades, and the main shaft from the engine to the clutch is equipped with an intermediate bearing. Owing to the position of the gear box, an exceptionally short propeller shaft is necessary to carry the drive to the rear axle; a steel sleeve bolted to the differential casing at the rear and attached to a cross member forward by forked arms and spring suspension, surrounds the propeller shaft and acts as a torque rod.

An unusual form of pressed steel frame is shown in the Fiat shaft-driven town vehicle, the side members being deeply dropped to give the lowest possible entry, the face of the frame considerable broadened as it leaves the sweep, and narrowed in front to give a wide steering angle. The rear axle casing, too, is distinctive in consisting of a two-piece stamping bolted longitudinally. Delahaye displayed the only two-cylinder cars in the exhibition, two models being on view, one a cab complete with taximeter as used by the New York Transportation Company, and the other a similar chassis with a more elaborate closed body.

Sixes Are Only Moderately Numerous.

Among the larger models shown at the Garden the greatest novelty is undoubtedly the six-cylinder Renault with automatic self-starter. When the show opened the six was the only vehicle not in place. An hour later its appearance was announced, and in almost less time than it takes to tell Bernin had climbed up behind the steering wheel, steered the car to a position on the stand, and workmen were busily removing the effects of sea water on the unprotected parts.

On this model as well as the larger four-cylinder cars a compressed air self-starter is fitted as an extra wherever required. The device consists of an air-cooled pump on the forward end of the engine, driven off the distribution gears, and compressing air into a metal tank hung within the frame. All the control of the apparatus is fitted to the right hand side of the dashboard, the operation of a small lever here allowing the air to pass from the tank to the cylinders through a rotary distributing valve. Use can be made of the compressed air for tire inflation purposes, by a Michelin outlet and pressure indicator attached on the dashboard. Two bolts only, held in their base by swivel joints, held the pump in position, dismantling being thus the



PROTECTION AGAINST THE WEATHER, A LA ROTHSCHILD.

simplest operation. Altogether the design and workmanship of the self-starter is a production calling for unstinted praise.

In all essential features the Renault six is merely a case of adding another unit to the four-cylinder engine, transmission, drive, suspension and other features being similar with the exception of strengthening for the extra load that the car is intended to carry. In addition to the several chassis shown on the Renault stand, a number of cars were displayed with handsome closed bodies, and the racy runabout which established a new track record at the Morris Park twenty-four-hour race has a place of honor.

Hotchkiss, Fiat, Delaunay-Belleville, and Rolls-Royce supply the remainder of the sixes at the Garden, Delaunay-Belleville having the cylinders cast separately, Rolls-Royce with two groups of three each, and the other with castings in pairs.

Rendering the Engine More Accessible.

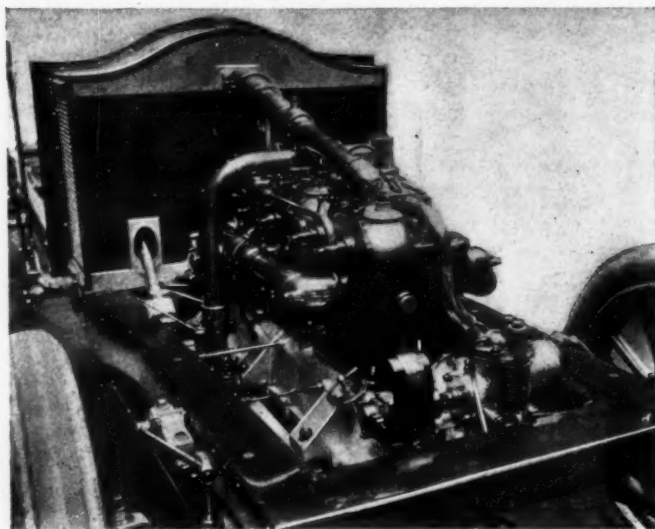
Refinements in detail which render an engine more accessible or simplify the care of a car are probably no more carefully thought out on any vehicle than the Delaunay-Belleville. Securing the magneto on its platform by means of an encircling band is too common a practice now to call for much comment; in the Delaunay-Belleville models not only is the magneto secured in this manner, but the pump, carried on the opposite side of the engine, has a similar method of attachment. After disconnecting the two lengths of piping, all that is necessary to dismount the pump is to unscrew the band attachment and lift it off its pins. All the electric cables are contained in metal tubes, which instead of being attached permanently by screws are held to the water piping by spring clips; thus the magneto and all cabling can be dismounted in a few seconds without the use of tools.

Benz, Züst and Maja constituted a trio which might be regarded as newcomers, though all have an excellent reputation

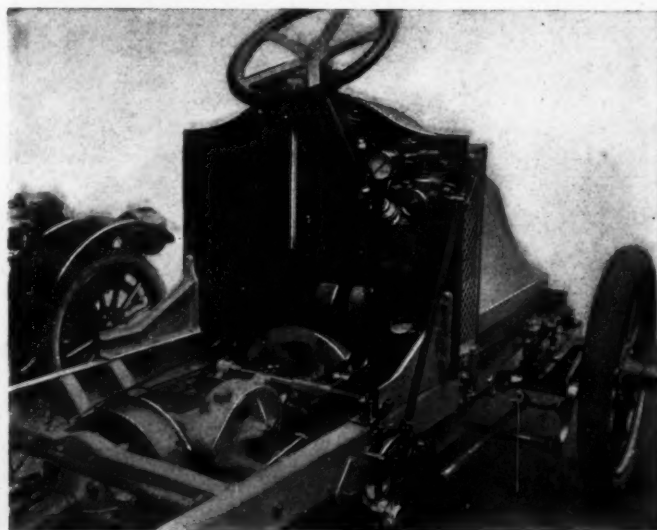
on the other side of the Atlantic. Maja is newer in name than in deed, for the newcomer is a member of the Mercedes family, marketed direct in America by a separate company, but built very largely on the well-known Mercedes lines. One distinctive feature is that either shaft or chain drive will be supplied to order on the two models now on the market.

Carriage Work Reveals Good Native Talent.

In body work American firms occupy a larger share of space than the foreigners, most of the chassis from abroad being equipped with bodies made in this country, principally by such well-known makers as Rothschild, Quinby, and Brewster. The credit of the biggest body belongs to the Delahaye stand, where



RENAULT SIX-CYLINDER CHASSIS WITH AUTOMATIC SELF-STARTER.



HOW THE SELF-STARTER AND TIRE INFLATOR ARE CONTROLLED.

a rear entrance saloon car is shown, fitted with four armchairs and a couple of writing cabinets. The car is excellently upholstered, fitted with electric light, electric annunciator and every luxury usually only associated with the most comfortable railroad travel.

Apart from this, all the bodywork is more marked for excellence in workmanship than eccentricity in design, houses on wheels not generally being a great success even on the best roads of Europe. Two or three cases were noticed where the rear seat of a touring car was divided into either two or three, in the same way as is commonly done for the front seats. A Flaudrau body on a Pilain chassis is a good example of this, other improvements on the same car being footboards which can be



AN EXCELLENT EXAMPLE OF THE USE OF ALUMINUM FOR BODIES.

raised to any desired angle, and folding seats attached to the side of the tonneau by a single slot and pin without the use of a leg for the seat. There is a tendency on the landaulet bodies to provide protection for drivers, at present left fully exposed to the weather. This is accomplished by a neat folding hood to lie near to the closed body when not in use, extending outward as far as the dashboard when opened.

A distinct novelty in the covering of an open touring car is shown on an Isotta-Fraschini with a short top with only one side bow, extending forward as far as the back of the front seats. The driver is protected by a Huillier windshield, swinging at the top, and connected to the dashboard by a leather apron. Between the hood and the shield a waterproof leather cover can be buttoned in position, completely protecting both passengers and drivers. With such an arrangement the protection afforded would not be equal to that of a car with a large cape top, but would still be sufficient to keep off heavy rain and have the advantage of adding little to the weight of the car and of being easily stowed away.

As an example of what can be done with aluminum in the construction of high-grade carriage bodies, Rothschild displays a limousine in an unfinished condition built exclusively of this metal, the use of which has allowed a minimum of joints impossible with any other form of construction. There were numerous other examples of aluminum body construction, though none that equaled this for the employment of large sheets of metal without seams, or that revealed so perfectly what can be done with this metal. Carriage work was invariably of the highest grade, a feature of the finish being the employment of subdued tones and the dull finish of much of the metal work hitherto conspicuous for its glitter.

Accessory Display Is Largely a Repetition.

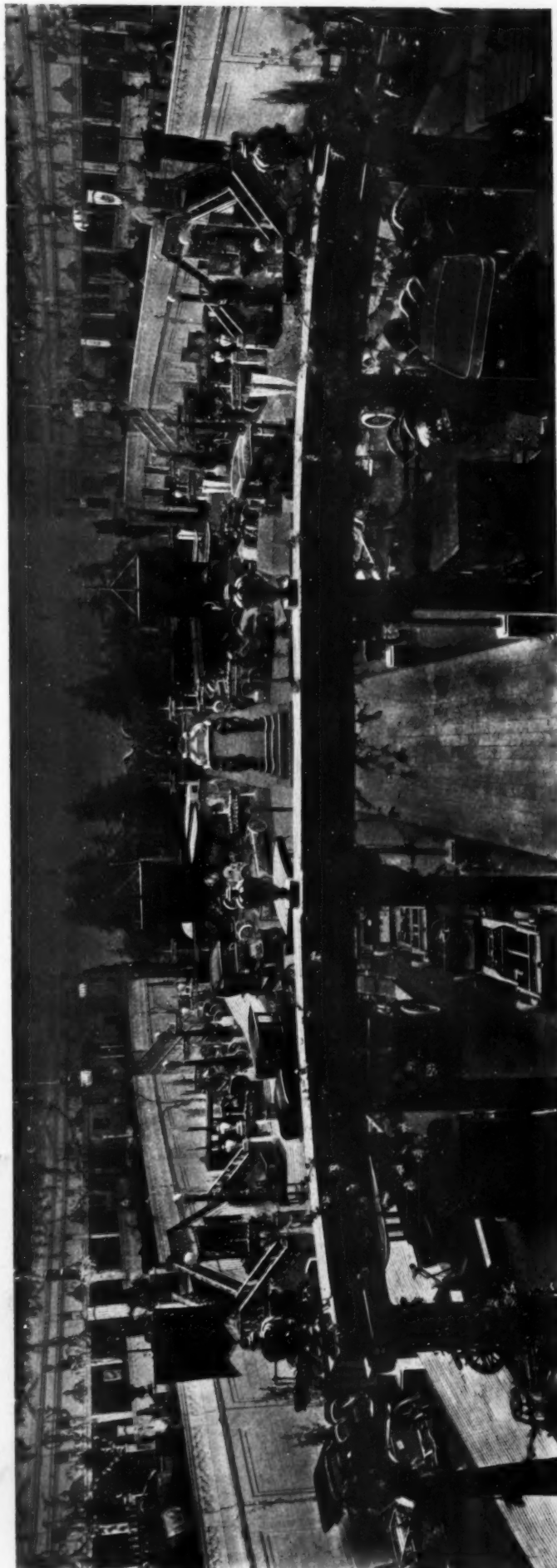
On the mezzanine floor, accessory dealers hold their usual display of the thousand and one articles useful if not always absolutely necessary to the running of an automobile. In the majority of cases these have been exhibited at the preceding shows in the Garden or the Grand Central Palace and provide little in the way of novelty.

Merely as a means of drawing attention to a well-known article, the use of a couple of small wagons at the Truffault-Hartford shock absorber stand is novel and effective. One of the little vehicles is fitted with shock absorbers, the other is not. Each one is placed over a revolving drum with a raised leather band across its face, and nothing could better exhibit the value of the shock absorbing device than the relative behavior of the two cars when the drum revolves.

A new force-feed oiler, patents for which have been obtained in all foreign countries, was shown by the Geo. Wood Manufacturing Company. The features of the instrument are the positive flow of oil and the extreme simplicity of all the parts, as an example of which may be mentioned the entire removal of all the plungers on the withdrawal of three screws. Driving the oiler in a reverse direction, no matter at what speed, could not possibly injure it.

In the tire realm one of the few novelties is a dismountable rim introduced by the Healy Leather Tire Company. Unlike the majority of quick-change devices on the market, a double rim has not to be employed, the dismountable rim attaching direct to the spokes of the wheel by means of patent clips with a screw for each. The advantages are a saving in weight, a dismountable rim of the Healy type being no heavier than an ordinary wheel, the impossibility of binding, for two metal surfaces are not brought together, and the retention of the ordinary valve and safety lugs. It should be possible for any ordinarily experienced person to make a change of rim by the Healy method in three minutes, the operation being the simple one of slackening a nut at the end of each spoke, changing the rim and tightening up again. The only tool required is a screw brace.

Arctic exploration being the order of the day, the Healy peo-



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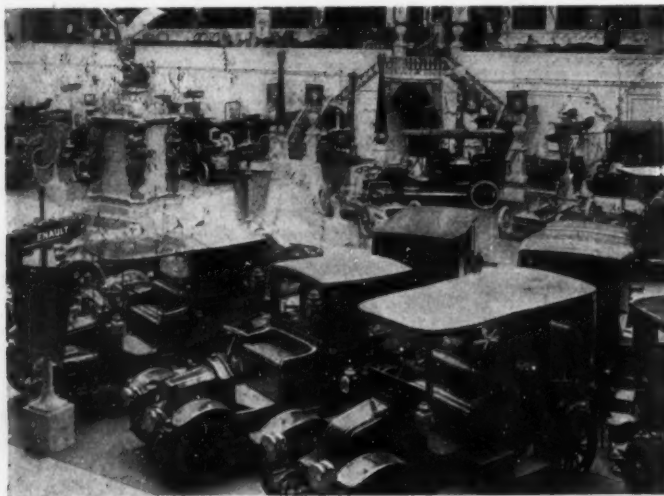
A FEW RELICS FROM THE EARLY DAYS OF THE CENTURY.

ple have adopted a steel-spiked rim to their new device, the Arctic aid being a steel rim to take the place of the tire rim, its face instead of being grooved for the tire, being studded with projecting steel spikes, certain to find a hold on any frozen surface.

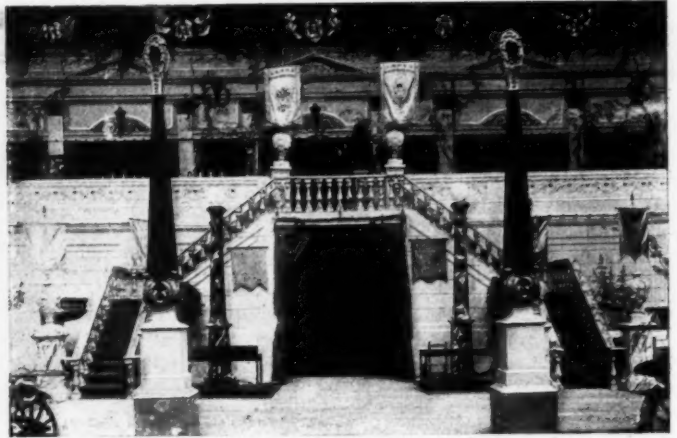
The Locomotion of the Ages.

Madison Square, like Paris, has its retrospective exhibition, the home event comprising four units: an ancient Dietrich; an equally venerable Panhard, with a true tonneau such as no modern dealer could supply on request; a Renault racer, which figured in the Paris-Madrid of 1903; and a four-cylinder Rolls-Royce, which bore a very close resemblance to the car with which Rolls won the Tourist Trophy race in the Isle of Man.

Taking another lesson from the note-book of the Paris exhibition, the Importers organized a spectacular fête on New Year's eve, the subject of which was locomotion throughout the ages. Going back to pre-Adamite days, the parade, led by a band, showed the first stage of locomotion in the form of a monkey on all fours. Man walking on his hind legs came as the natural successor, an oxen following next in the stage of development. After this slow and ponderous beast, came each in its order, the representatives of the transportation of the ancient civilization of the East—Hindoos bearing a palanquin on their shoulders, the sprightly Jap dragging the forerunner of the buggy behind him in the shape of the jinrikisha, and then the first of the swift four-footers, the Egyptians, Romans, and Greeks in their chariots, and again a retrogression, so far as speed was concerned, in the shape of the elephants of the Persians, and the European sedan chairs, followed as a wind-up of this part of the procession, by donkeys and horses drawing the first fourwheelers.



RENAULT POSSESSED ONE OF MOST COMPLETE EXHIBITS IN SHOW.

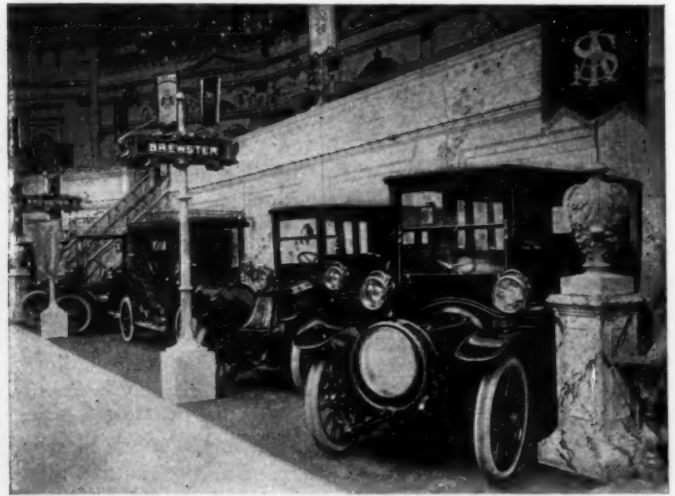


HOW CONNECTION WAS MADE FROM GROUND FLOOR TO GALLERY.]

Then came the age of steam, represented by an engine, and the next step in the form of a bicycle, while following closely upon its rear wheel came the final triumph of modern genius in the field of locomotion—the automobile, with old Father Time driving a replica of the first automobile, while its modern successors were guided by the "Spirit of 1908."

The pageant solemnly filed round the aisles of the Garden during the witching hour when all the outside world was welcoming the New Year in an ecstasy of noise, but the novelty of the procession and the interest it excited made it a drawing card on New Year's day, when it was repeated at 4 o'clock in the afternoon and again at 9 o'clock in the evening.

The brunt of the labor in connection with the highly successful Importers' show naturally fell on the show committee, consisting of André Massenat, E. Lillie, E. R. Hollander and General Manager C. R. Mabley, though others connected with the display comprised J. S. Josephs, president; C. F. Wyckoff, S. B. Bowman, Paul Lacroix, Gaston R. Rheims, Percy Owen and Geo. M. MacWilliams. Credit for the excellent decorative effect, which has aroused universal admiration, is due to S. R. Ball. Naturally numerous conjectures have been made as to the cost of what is undoubtedly the finest decorative scheme seen at any American automobile show, \$60,000 being quoted in very authoritative circles. As it is intended, however, to dispose of almost the entire effects to the promoters of a succeeding show, the final cost will doubtless be considerably lower than the figures quoted. Though this first real show independently fostered by the Importers cannot be put down as being other than a great success in many ways, there is a more or less settled conviction that it is the first and last of its kind to be seen in New York.



BREWSTER BODIES ON SOME OF THE FINEST FRENCH CHASSIS.

Latest Doings of the Sky Navigators

MARCAZ DIVIDED AIRSHIP, WITH PROPELLER AMIDSHIPS BETWEEN TWO HALVES, SHOWN AT GALERIE DES MACHINES, PARIS.

PARIS, Dec. 23.—A dirigible balloon with its propeller in the center is an aeronautical novelty attracting the sky navigator to the Galerie des Machines, Paris. Baron Edmond de Marcaz and a Dutch engineer, M. Kluytmans, have produced the new ship with a view to overcoming the lack of stability which is generally found in vessels of the *Patrie* and *Ville de Paris* types as soon as the propellers are put into operation. In the former class the double propellers revolving at 1,100 revolutions a minute are carried below the envelope in the center of the cage; in the latter class a single screw turning at 140 revolutions a minute is carried at the forward end of the cage. Removed some twenty or thirty feet from the center of the balloon the defects of the two systems are apparent in a strong wind. To overcome the difficulty, compensators have been employed with considerable success, and naturally the lines of the ship influence in no small measure, but when all has been done rolling is the *bête noire* of the aerial sailor.

The Marcaz airship consists of a couple of long sausage-shaped bags placed end to end and having a connection through the center of their axis, in order to equalize the gas pressure in the two compartments. The propeller is attached to the frame in the center of the balloon, its two arms describing a circle of larger diameter than that of the balloon. The motor is carried on an under frame below the gas bag, transmission being by means of a long belt. Experiments made in the Galerie des Machines, the balloon being guided along by a rope, were thoroughly satisfactory. As soon as possible outdoor experiments will be undertaken, for as the propellers have been arranged to improve stability it is only by trials in a wind that their real worth can be determined.

Aeroplanists Busy Training.

PARIS, Dec. 23.—Santos Dumont is busy on *The Butterfly* No. 19, although No. 18, a water craft, has not yet fulfilled the mission for which it was created. The latest edition of *The Butterfly* is a modification of one which appeared at Bagatelle nearly two months ago without much success. Instead of a single propeller forward, it has been reconstructed to provide two separate propellers of bamboo frame covered with silk, both at the forward part of the machine, and driven by a round belt. The motor retains its original position in the angle of the two wings, made of bamboo frame covered with varnished silk. The method of transmission, with which Santos Dumont is said not to be altogether satisfied, is

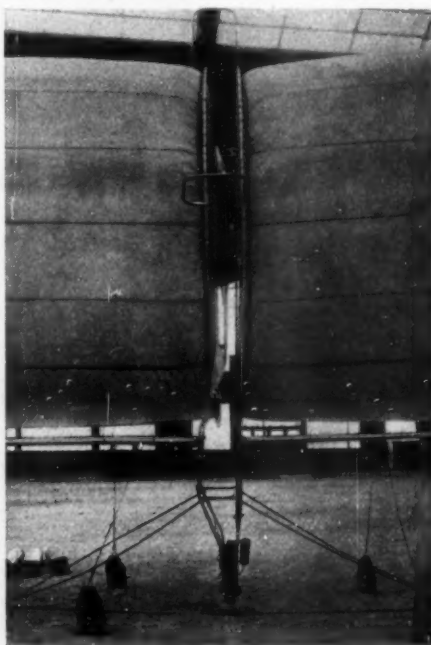
somewhat unusual, a crossed belt running from the flywheel of the engine to a bicycle wheel with a grooved face, to which is attached one of the two-bladed propellers; the companion propeller is driven by a connecting rod from the belt-driven wheel. No other changes appear to have been made in the construction of the aeroplane, the machine being one of the lightest and smallest ever seen on a testing ground. What it is capable of doing under practical conditions has not yet been determined, for on the first day that speed was attempted the belt came off and broke one of the propellers. It was not a serious accident, but several days will pass before another run can be made.

Henry Farman, unlike his principal rival, remains true to one machine, but loses no opportunity of training both himself and it for the kilometer flight in a circle. Bad weather has hindered the attempts of the last few weeks, but on every occasion on which it has been possible to be out he has made attempts at flight. During the past week he has made a number of flights varying in length from 300 to 400 yards with ease.

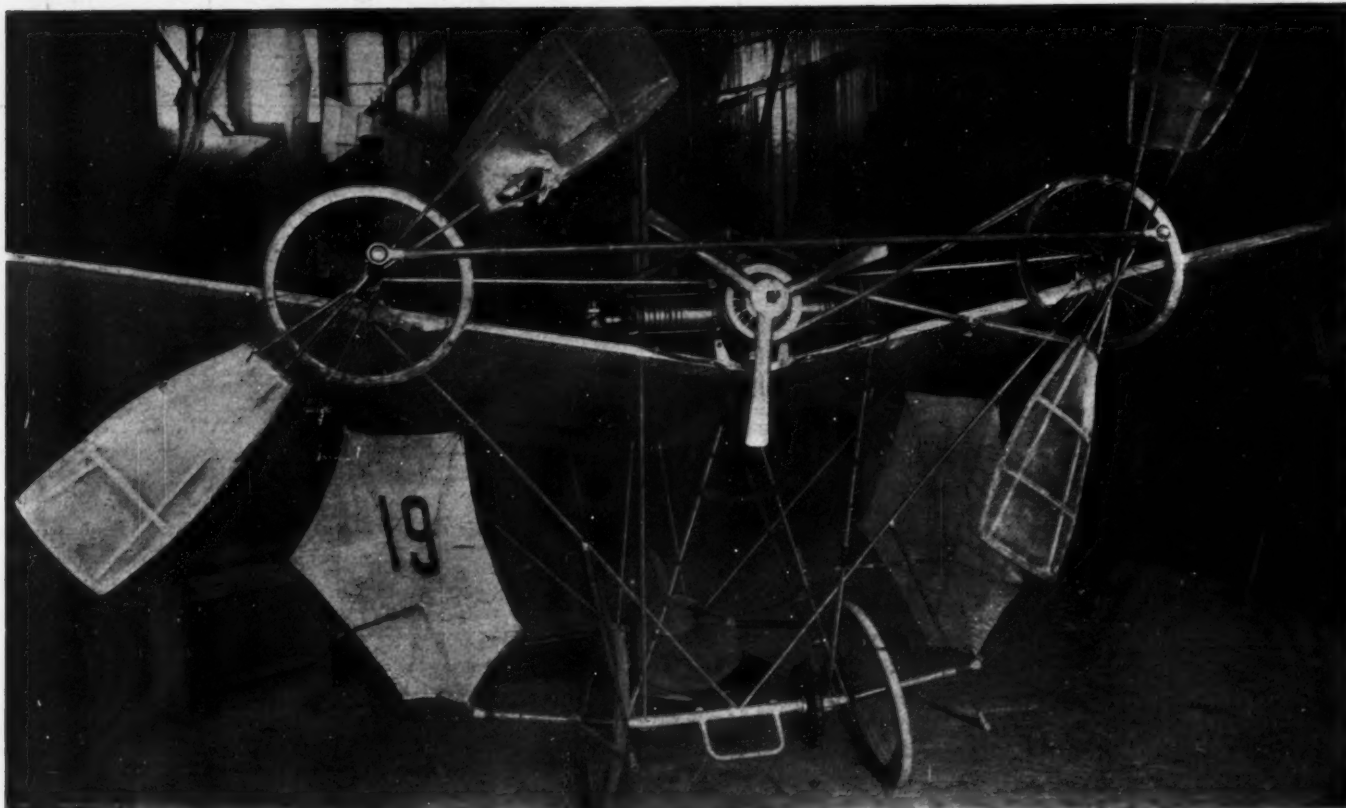
Louis Bleriot, in an attempt at Issy-les-Moulineaux to capture one of the club prizes for a 150-meter flight, was exactly five meters short of victory and a shorter distance of meeting his death. An excellent flight had been made in the presence of the Club Committee, which terminated so successfully that all thought the prize won. On measuring the ground, however, it was discovered that the flight was five meters short of being up to standard, and a fresh attempt was begun without delay. The second flight,

made at three yards from the ground, was apparently successful, but on descending, the left road wheel collapsed, the wing scraped the ground, and in a second the aeroplane had capsized. The committee, followed by Madame Bleriot, who was on the ground, rushed to the spot and withdrew the skypilot with some difficulty, happily uninjured except for a bruised shoulder. His machine, however, was badly damaged, the propeller and shaft being broken and the wings injured. The Antoinette motor, however, was in perfect condition. Bleriot, though possessor of some of the most promising aeroplanes, designed and built by the best makers, has so often met with accidents when success seemed certain that his ill-luck has become proverbial among French aeronauts.

The Ferber-Antoinette aeroplane, designed and built by the maker of the celebrated light weight motor, has reached completion and is expected to be tried out as soon as weather conditions are satisfactory. The motive power is a 100-horsepower 16-cylinder Antoinette engine.



1 CENTRAL PROPELLER AND MOTOR.



SANTOS-DUMONT'S BUTTERFLY AS IT APPEARS WHEN FITTED WITH TWO ADDITIONAL BELT-DRIVEN PROPELLERS.

FARMAN WILL CELEBRATE NEW YEAR FLYING.

Henry Farman is again ready for an attempted flight of a kilometer in a closed circle, the accomplishment of which will entitle him to the Deutsch-Archdeacon prize of \$10,000, according to dispatches received from Paris. On Monday afternoon at the Issy-les-Moulineaux drill ground, near Paris, Farman brought out the aeroplane which he has employed for the past few months, but which has recently undergone some minor improvements, and almost succeeded in accomplishing a record flight. After running on the ground for a couple of hundred yards, the machine shot into the air and traveled to the extreme end of the open ground, at a height of about three yards. Farman then operated the rudder and began a difficult turning movement, which, when about half accomplished, was spoiled by a group of workmen getting into his path. To avoid hitting them the aeroplane had to be suddenly swerved, causing the wheels to touch the ground for a fraction of a second. Rising again immediately, the flight was finished in magnificent style, the machine being brought to earth within a few inches from the spot on which it had started. Farman declares that he has considerably improved his aeroplane by covering the front edge of the lower plane with canvas, rounding it off and reducing the air friction. When he has made the same change on the upper plane he believes that still better results will be possible.

Official notice has been given the Aero Club officials that Henry Farman will make an attempt to win the Deutsch-Archdeacon prize this week. To claim the \$10,000 prize the machine must cover a distance of one kilometer in the air, leaving the earth on a given line, turn around a post 500 meters ahead, return and cross the starting line again, descending at the point from which it took flight, or, if that is impossible, dropping in its flight some object within a circle of 25 yards from that point. The severity of the test lies in the turn around the outer post and the descent to earth at almost the exact starting point. Having on two separate occasions come within a few inches of meeting all conditions for the prize, when on practice spins, it is believed that Farman has every chance of winning the gold.

BERLIN TO SEE START OF THIRD AERO RACE.

Berlin will succeed St. Louis as the starting point of the third annual international race for the Gordon Bennett Aeronautical Cup, according to information received from Germany by the Aero Club of America. By reason of the victory of a German pilot in the last contest the next race must be held in Germany at any suitable point selected by the national club. After a thorough search and a consideration of the claim of a number of cities, the capital has been decided to be the most convenient spot from which to start the aeronautical competitors, the date of the 1908 race to be about October 1. Assurance is given that the Kaiser, who has always taken a keen interest in aeronautics, will be present at the start of the race. Owing to the large number of German aeronauts desiring to participate in the race for the cup, it is probable that elimination races will be held to select a team. France and America have already sent official challenges for the 1908 race.

Lieutenant Frank P. Lahm, winner of the first international balloon race, started from Paris in 1906, returned to America last Sunday on board the St. Louis. After undergoing a special course of training at the French military cavalry school at Saumur, Lieutenant Lahm was commissioned by the United States Government to make a thorough investigation into aeronautical matters throughout Europe. For this purpose he has visited France, England and Germany, examined the military airships of these countries, and had an opportunity of witnessing all recent aeroplane experiments in France. Lieutenant Lahm will proceed at once to Washington to present his report.

AERO CLUB MEMBERS AROUND FESTIVE BOARD.

Members of the Aero Club of America will unite in the second monthly club dinner at 6:30 P.M. on Tuesday, January 7, in the dining room of the Automobile Club of America, on Fifty-fourth street, west of Broadway. Dinner will be followed by an interesting lecture by Courtland Field Bishop and later by a smoker.

THE FUEL SYSTEM OF AUTOMOBILES*

By THOS. J. FAY, E.E.

IN the case of a new motor it is not so easy, for then it may be a question of adjustment, or perchance the carbureter is not of the right type at all. True, it would be strange for anyone to employ a carbureter of a character unsuited to the motor, in any given case, but such things are done, and it is necessary to take this phase of the situation into account. On one occasion the author essayed to deliver a new car to a friend, a car, in fact, of which the author had but slight personal knowledge. A brave start was made, but it ended in a long struggle, because one of the valves of the carbureter was not present, having been overlooked in the assembling process, and no notice was taken of the fact because the author did not know how the thing was constructed. It was necessary to call upon the maker to send a man to try to make the motor work properly, when, lo and behold, the expert fell into the same trap. In the end a little waste pressed into the passageways produced the same result as a valve and it was easy to discover that a part was missing.

The great question is to think, and to systematically try the various schemes likely to solve the problem, when the carbureter fails to do its work. Some of the ills are due to one cause and more to another. If the motor will not crank to a start, the mixture may be impoverished; if so, it is necessary to proceed to render the mixture rich by throttling the cold air and by reducing the area of the hot air passageway until the amount of fuel is sufficient to render the mixture efficient.

At such a time it is a good idea to make sure that the gasoline is present in adequate volume, and that water is not in the way. The pressure should be looked after, and it is well to make sure the spark is satisfactory. But a few days ago a friend called the author on the 'phone, late at night, and stated that he was down on Long Island with a car and could not make it "budge." He had tried every device known to the experienced motorist, but to no avail, so he said. The car was a "one-lunger," and it occurred to the author that the spark plug (porcelain) was split. Mr. Motorist said no, but after some talk he was induced to try a new plug, only to find that the motor cranked readily and gave no further trouble at all. Later the author learned that the autoist had previously tried the plug (in the air) and since it gave a good spark he assumed it was not defective. He did not take into account the fact that the resistance in the air is far lower than when in the cylinder under compression. The split in the porcelain was so slight as not to be seen at night, but it was enough to defeat the spark.

Think First and Look for Trouble After.

If the spark is good and the timing is right, it is then possible to proceed to locate carbureter trouble with a good measure of confidence. The more easy, to be sure, if the car may have previously performed in a satisfactory manner with the same carbureter; but it is always a good idea to think first and look for the trouble afterwards. On one car the gasoline pipe was led to the carbureter in a very roundabout manner and the author, en route from Rockaway Beach at night, miles from a habitation, found himself with a dead car, and after some time discovered that a "cock" in the gasoline pipe, well concealed under the car, with the handle so set as to jar the cock in the closed position, had succeeded in doing so. The cock leaked slightly and every time the carbureter was examined it showed gasoline. Upon starting the motor it would run for a moment and then die; there was no way to tell just what was the trouble, and it looked like a case of camping out all night. Upon entirely removing the pipe the trouble was found.

The relation of the hot to the cold air is a matter to adjust with some care. The hot air, as a rule, enters by a passageway

in juxtaposition to the nozzle, or the nozzle is in the hot air passageway. At all events the hot air is necessary in the process of vaporizing the gasoline and must be in quantity sufficient to do the work. Gasoline is a refrigerant, that is on changing from its liquid to its gaseous state the temperature is lowered, but in view of its low efficiency in this respect the amount of hot air needed is not great. In cranking a motor the cold air port is closed completely and the hot air port is so closed as to assure a rich mixture, so rich, in fact, as to supply an adequate fuel value, barely to keep the motor in motion at lowest speed.

That the flywheel has much to do with the matter may be proven by the simple expedient of trying to do without a flywheel, whilst on the other hand the heavier the flywheel the slower will the motor run if the mixture is rich and homogeneous. Just what should be the richness of the initial mixture is a matter to be settled in time, if in time knowledge of the fact will be afforded. As it is, one may be sure the mixture may be more rich if the compression is high than if the reverse is true, and it may be the richness, if the mixture is not far from five volumes of atmospheric air to one volume of vapor of gas-

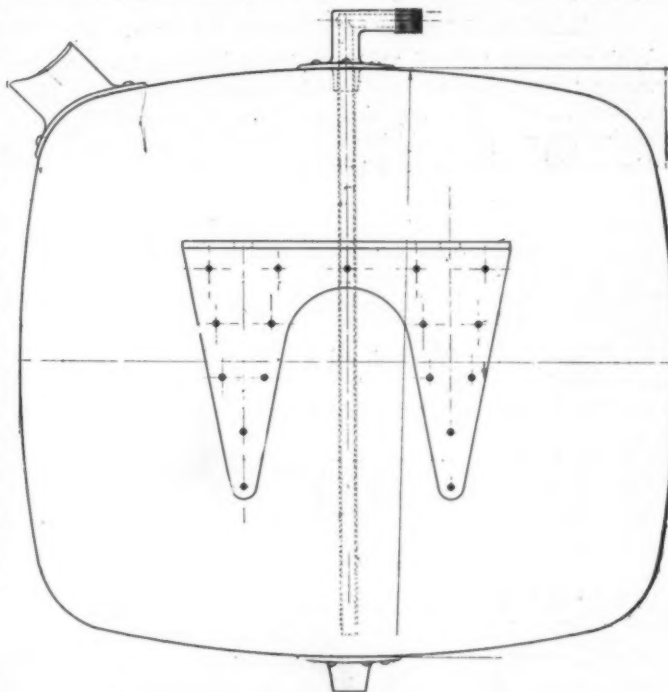


FIG. 1.—Details of copper fuel tank and supporting bracket.

oline. Such a mixture would be very slow-burning and would be favorable to the starting project. It is necessary to have a slow-burning mixture, starting or running slow, else the piston would not get out of the way of the wave and the energy would be spent in heat to the water jacket, since a high increase in pressure would mean a high rate of transfer to the jacket.

There is always a certain relation of the rate of inflammation of the mixture to that of the velocity of the piston that evolves the maximum of useful work. This view of the matter seldom if ever receives a measure of attention, and it must be taken into account. Carbureters, as they are sometimes built, allow for a constant richness of the mixture, and a variable supply; the variable supply affects the rate of inflammation and in a way acts the same as if the richness were altered to bring about the same end. If, however, the throttle is used, the number of heat units change, whereas, if the fuel valve is held constant per cubic inch of mixture the fuel will do more work. Torque (pull in pounds at unit radius) is what is wanted, either in

* Continued from page 945 of THE AUTOMOBILE, issue of December 26, 1907.

starting or in running a motor at a slow rate of speed. Plainly, then, the change in quantity of the mixture is not so likely to produce the best results as if the thermal value be changed to produce a slower rate of inflammation with decreasing speed, or an increasing rate of inflammation with increasing speed, the

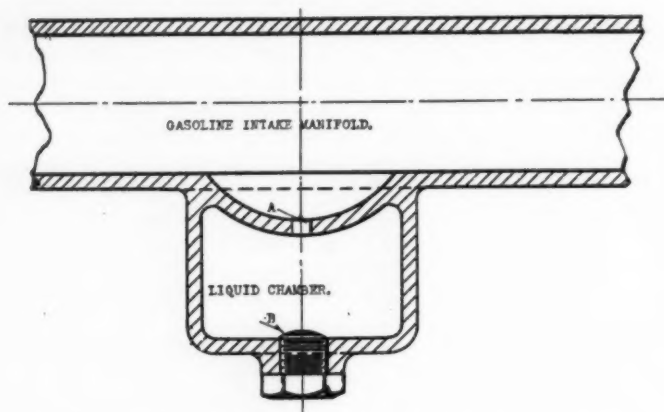


FIG. 2.—"Skimmer" or sump to collect liquid gasoline from manifold.

product of decreasing thermal value being brought about by the simple expedient of diluting the mixture with cold air.

Relation of Torque to Different Mixtures.

With changing thermal value on increasing speed comes decreasing torque, just as one would suppose. This same phenomenon would follow any similar scheme of procedure, while changing the volume would introduce other complications.

Motors deliver power on a basis as follows:

$$H. P. = S \times T,$$

in which:

The maximum *H. P.* (horsepower) follows; *S* (speed) maximum, and; *T* (torque) maximum.

The torque falls off with increasing speed for reasons as follows:

- (a) The richness (thermal value) of the mixture decreases with increasing speed.
- (b) The scavenging of the motor is less perfect as the speed increases.
- (c) The friction component increases with the speed.
- (d) The timing of the spark is more difficult and the ills due to this matter are emphasized.
- (e) The torque falls fast if the compression is low, and *vice versa*.

Unfortunately the torque does not hold maximum for maximum speed, and the formula takes this into account, since the maximum power follows, if the greatest sum of speed and torque is taken. Some motors deliver this maximum summation at one speed and many at another. In the author's experience the highest attainable value was found in a racing motor at a speed of 1,800 revolutions per minute, whilst, as a rule, the maximum is realized at about 900 revolutions per minute.

These are matters of deliberate design rather than a chance, since if the valves are of liberal area and the compression is high the greatest power will be realized at high speed, whereas if the valves are small and the compression is low the maximum will be realized at a lower speed. The torque at a low speed will be the most favorable in a motor designed to deliver its maximum power at a comparatively low speed, and the lower speed motor is the most satisfactory for general service.

Broadly speaking, these are not carbureter matters, whilst in detail they surely are, for if a motor is of the high-speed type the carbureter must be designed to do the work on a high-speed basis. The common practice of using a common type of carbureter for all designs of motors in common leads to common results. The gasoline economy is a matter of growing importance, because the price of the commodity is slowly but

surely inflating, and the quality is slowly but surely falling off. Furthermore, motors are increasing in size, and as a sequence economy must follow. Economy demands the use of a carbureter exactly in accord with the motor's characteristics in each individual case, and to know what to do with the carbureter it is necessary to know about the motor. Some carbureters are not provided with hot air passages at all, and such adaptations are not only uneconomical but troublesome.

Motors will deliver more power, start easier and do with considerably less gasoline if the hot air connection is afforded, particularly if the relation of the hot to the cold air is nicely maintained. The mixture will be homogeneous and condensation will be done away with to a large extent. This condensation is most uneconomical and the presence of liquid in the passageways destroys the evenness of the mixture to such an extent as to defeat good running conditions. The depression chamber in a carbureter is a most important part of the device, since upon the depression depends the amount of fuel that can be lifted from the nozzle; moreover, the extent of the spraying will be in a measure dependent upon the same performance.

The depression comes from merely contracting the area of the passageway at the junction of the nozzle, and this area should be in some relation to the area of the cylinder of the motor. The most suitable area is not a matter that has been nicely fixed, nor is it an easy thing to do, since much depends upon the shape of the passageway and the position of the nozzle, if, indeed, the area of the nozzle may not have to be taken into account in this connection. Broadly, the area of the cylinder of the motor may be forty times the area of the hot air passageway at the junction of the nozzle forming the depression chamber. Whilst there is no great proof to bring to bear on the point, the cold air should not be allowed to mix with the rich mixture too quickly, thus giving the rich mixture full scope to become a gas, rather than an aggregation of liquid fuel, in spray form, immeshed in a current of hot air.

If the cold air too quickly strikes the forming mixture the condensation phenomenon will be in evidence, and this will be fatal to the results. Some claim this is a matter of no moment, if only the manifold connecting the motor with the carbureter is long. More claim that liquid, even in the cylinder, does no great harm, since it will flash into gas in the heated atmosphere. Any such argument is surely resting upon a quagmire, because the liquid in the cylinder will be either extra to the amount required to saturate the air or stratification will be the main phenomenon and to no good purpose.

Dead points in the performance of carbureters must be due to the inability to deliver firing mixtures at all speeds, and the result is, at some speeds, the mixtures are not sufficiently inflammable. This non-inflammability can

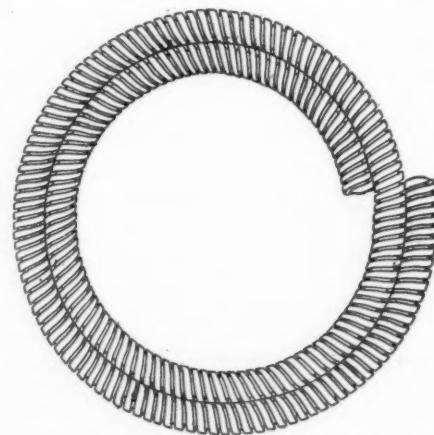


FIG. 3.—Sample of high-pressure gasoline tubing showing its extreme flexibility.

follow condensation, or it may be due to over-much gasoline forming a slow-burning mixture as well as a flash charge, out of the way of which the piston cannot travel in a space of time so short as to render the energy efficient. In such cases popping in the carbureter will be noticeable, and it is a simple sign of impoverished mixture, due to excess cold air, at the point at which it transpires. If the motor performs well at a higher speed, the

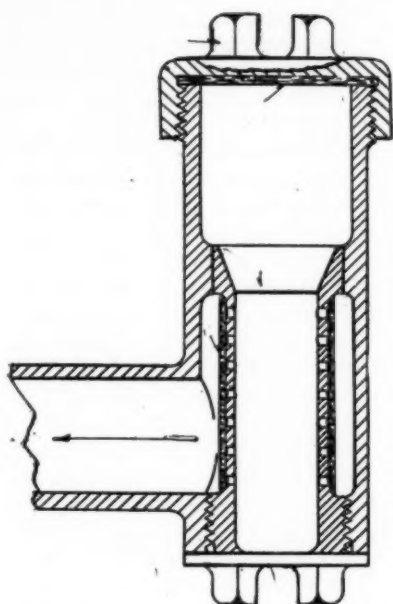


FIG. 4.—Manner of locating filter in gasoline filler vent on the fuel tank.

Black smoke (without a gasoline odor) will be the evidence of this; if, however, the odor is of gasoline, excess gasoline is a further complication to be coped with. At all events, the gasoline vapor in a more or less combusted state is not so black and it is always well to eliminate the lubricating oil complication before fighting the fuel trouble.

Some Modern Tendencies Considered.

As gasoline becomes heavier, due to the scarcity of the supply of the lighter distillates, the difficulty in rendering the heavier products quick-combusting must be taken into account. One way to accomplish this feat is to employ a detonator, such as acetylene. A very small trace of this gas serves to render slow-burning mixtures, quick-burning instead. This is a good thing to know from another point of view, for if a motor refuses to crank a little of the acetylene gas from the generator used for lighting, led to the air intake of the carbureter, will do remarkable work and do no harm. The idea of adding detonating compounds to the fuel is gaining ground, and this is the most important detail of what are termed synthetic fuel products at the present time. Later on, perhaps, this genera of fuel will assume a greater importance, only if the cost can be reduced or if the cost of gasoline increases considerably over the present cost, not value, as but little consideration is required to show that this is a distinction with not a little difference, although the majority of autoists seldom look at the matter in this light, regarding these terms as practically synonymous.

Besides acetylene there are other detonators, as ammonia nitrate, picric acid, etc. Some of the detonators serve as etching compounds and as a consequence are not desirable, since the cylinder walls would be destroyed as a consequence of their use. Picric acid, for illustration, is used as an etching compound in metallurgy to prepare specimens to be micro-photographed, and the acid in question does not lose its ability to etch the surfaces of iron or steel merely because the shape of the metal is different or because the geographical position is different.

These detonators were used to some extent in racing work and in all probability some races were won on this account. In racing, if it is not foul to "dope" the fuel, it does not matter if the cylinders are destroyed if only they will hang out the race. What transpires in racing does not, of necessity, have anything to do with general practice, although it is a fact that racing has, on the whole, helped to develop the carbureter, if not the rest of the automobile. The fuel problem was undoubtedly advanced under racing conditions, and picric acid certainly did

defect is not serious, but if not, the gasoline supply is inadequate and the area of the nozzle should be increased.

In such a case the mixture will be found inferior for starting and by the introduction of more gasoline the motor will crank better and the speed may be reduced to a lower level, which, in itself, is a good characteristic. If a motor will work well at a very low speed, and at its maximum speed, the carbureter is quite at fault for missing at intermediate speeds. Sometimes the trouble is due to lubricating oil, too much of which reaches the cylinders at certain speeds.

play a part of some moment. The hydrocarbon products, as benzine, gasoline, etc., must, in the long run, go the way of all temporary expedients; the supply will be totally inadequate.

Some of the Hydro-carbon Products.

The products of crude oil vary considerably, even out of the same well, but they change very much for the several localities. The following will give a good idea of the composition of a sample of crude oil.

Above 76° Baumé, gasoline	3 per cent.
Between 63 and 76° Baumé, benzine	4 per cent.
Between 45 and 63° Baumé, kerosene	15 per cent.
Between 38 and 45° Baumé, heavy kerosene.....	8 per cent.
Between 28 and 38° Baumé, gas distillate.....	21 per cent.
Between 26 and 28° Baumé, light lubricating oil....	10 per cent.
Between 23 and 26° Baumé, neutral oil	12 per cent.
Between 21 and 23° Baumé, heavy neutral oil.....	6 per cent.
Between 14 and 21° Baumé, reduced stock.....	5 per cent.
Below 14° solid, asphalt	11 per cent.
Loss	5 per cent.

Total100 per cent.

It is a matter of no moment if this particular analysis is high or low in some of the distillates, since, in any event, the amount of usable liquid fuel is but a small percentage of the total under the most favorable conditions. To realize the liquid fuel the whole must be distilled, and the cost of handling the whole product is but one of the factors. Even if it was decided to abandon all but the part available for liquid fuel, the project would come to naught, because all the residue would have to be stored, since no sane community would allow the balance of the product to be dumped into a river or permit it to lay stagnant in a pool near any habitations.

To a large extent the law of compensation takes care of the inequalities, since the crude oil is now used to allay the dust of our roads, hence it may be observed that the automobile increased the demand for liquid fuel and at the same time created a demand for the by-product of the process. Automobiles create road dust and the by-product cements that dust, thus balancing the evils. At all events, it is as plain as can be that gasoline will ultimately have to be superseded by alcohol or a combination of alcohol and gasoline. The combination liquid fuel will, of course, hold some other compounds as detonators, like ammonia nitrate, etc., and acetone, or, what will serve the same purpose, render the synthetic fuel stable.

It would be very hazardous to attempt to use a synthetic fuel if there be any chance of the several products separating, since an increase in the percentage of ammonia nitrate by segregation, for instance, would result in an intense explosive. The author's firm have in hand experiments on this subject, but they are very slow and tiresome, since a full year is allowed ere a mixture is put into service, to make sure it will not decompose, and, in the process, form high explosives. True, it is possible to mix these fuels with some certainty, and it is hoped avoid all high

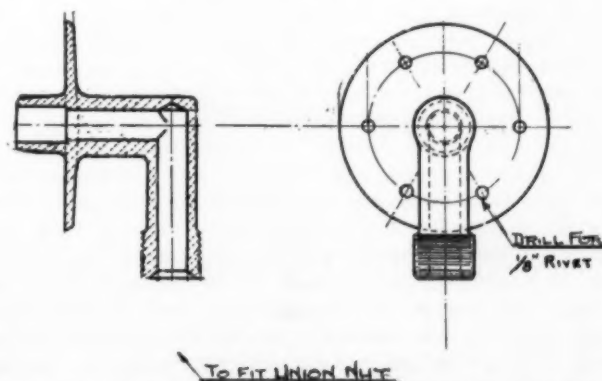


FIG. 5.—Details of fuel tank outlet and manner of application to the tank,

explosive formations, but this has never been the history of investigations into the performance of compounds that hold in their make-up earthquake propensities.

Alcohol alone is not, as yet, all sunshine, nor can it be said the alcoholic fuel will not attack the walls of cylinders, and it may not be out of place to observe the law of probabilities seems to hold in this as in other walks, since alcohol was ever wont to burn the coppers out of all who would insist upon its use. It was supposed motors were imbued with a sufficiently strong constitution to be immune, but there are grave fears on the subject. In the destructive process that obtains in a motor cylinder, especially if pyroligneous acid is present, and it is likely to be in the wood alcohol, at any rate, the cylinders are likely to be etched by the residue after the motor is shut down unless the last few minutes of the run are made with gasoline as the fuel. To what extent this will be a source of trouble remains to be seen; in time and as the product of experience. True, wood alcohol seems to be the great offender, and to avoid this it may be necessary to avoid its use.

The same carbureter cannot be used for all the fuels as carbureters are at present constructed, because the fuels are not all of the same density nor are all of them of the same thermal value. The floats would have to be adjusted to suit the gravity on each occasion and the nozzles would have to receive attention as well. The motors would not be economical for alcohol

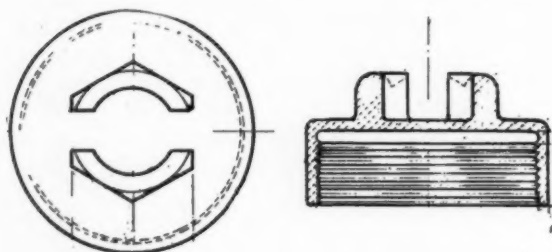


FIG. 6.—Plan and sectional views of tank filler cap, illustrating special nut.

with a compression arranged for gasoline, and, on the whole, it seems the specific fuel will have to be taken into account in designing both the motor and the carbureter. This is not to say a motor designed to use gasoline will not run on alcohol, for it will. The economy will not be good, however, and it would be better to pay far more for gasoline than to use alcohol under such conditions.

It would be feasible to use two carbureters and two tanks for the respective combustibles, if time should prove that necessity will demand the use of a fuel besides gasoline, but it is not now easy to see how the compression can be changed at will (upon changing the fuel) and not introduce much of complication. It is barely possible that the whole matter will take on a favorable turn in the course of time, since there are unbounded possibilities in the field of mixtures of alcohol, gasoline, acetone, nitrates, etc., from which to evolve a satisfactory fuel may only be a matter of time and application.

There is one other point, not yet raised by anyone thus far, that may be of the greatest importance, i. e., air-cooled motors, whilst they serve very well indeed, are nevertheless not yet constructed in the larger sizes, because it is not so easy to keep the temperature within bounds. Alcoholic fuel has a strong bearing upon this phase of the subject, and it is believed the motors will be considerably less difficult to keep cool. One of the reasons for this lies in the fact that this fuel holds upwards of 15 per cent. water, and as water, instead of being a source of heat, absorbs heat, and lowers the temperature of the whole. And again, since alcohol has a lower thermal value per volume at a given pressure, it is plain that the heat at that pressure will be less, and the one deduction is that the cooling requirement will be lower.

With the alcoholic fuel, as before stated, a higher compression is desirable. This is due to the fact that pre-ignition does not take place as it does with gasoline, at an earlier pressure, and the best compression in any internal combustion motor is the highest obtainable compression inside of the point at which pre-ignition and knocking become a troublesome matter. With the higher compression alcohol should do quite as well as gasoline, gallon for gallon of fuel, whilst the higher inflammability and the more complete combustion should end in nearly equal power for equal area of the piston in any given case.

The details in general of the fuel system will not have to be discussed here at any length, because they are fairly understood, but there are points of some moment that will stand more light. Fig. 2 shows a "skimmer," the function of which is to trap off the liquid that may condense in the manifold. The figure is plain enough as to require no length of description. The device is of almost no cost, it takes but little room, and there are no loose parts to become deranged. When the manifold is undergoing design it is perfectly simple to introduce this feature, and it may be a baffle plate in the passageway, between the motor and the skimmer, at a point near the skimmer, would be a good thing to include. The author has not tried this additional feature. Fig. 3 shows a flexible copper pipe for the fuel system that has merit in several ways, amongst which may be cited the ease of installing and the entire absence of any tendency to split. This piping is tight against a pressure of about 1,500 pounds per square inch, and will take bends to about 3 inches radius.

Fig. 4 shows a filter in the gasoline filler pipe that is well worth taking into account, as by its use it becomes unnecessary to bother about the methods used in putting gasoline in the tank. There is no good reason for depending upon the public at large for clean gasoline when a filter can just as well be a fixture in the system. The filter, as illustrated, allows for cleaning at will and when the filter fails to pass gasoline it is time to do something about it; moreover, one can then reflect on what would be the consequences of no filter.

Fig. 1 shows a means of fastening the gasoline tank to the chassis frame, and it may be well here to state that the fastening is an important matter not always given good attention. This fastening shows for itself and has the advantage of a big surface in contact with the copper tank, thus eliminating the chance of having the hangers tear out of their fastenings. The hangers are of 1-8-inch boiler plate and are both light and strong; moreover, they are both easy and inexpensive to make.

Fig. 6 shows a filler cap devised to take a leather packing ring, thus making the joint tight, whilst the leather lasts for a very long time. The most important feature of this cap is that of the hexagon wrench extension (or head). This hexagon extension is slotted in such a way as to allow of the use of a screwdriver or other tool in backing the cap off. It is not always possible to put one's hands on a wrench of the right size for the purpose, and in such cases the slot is a handy facility. Fig. 5 represents a pipe connection to the gasoline tank that is simple, tight and strong. Connections have long been a source of annoyance in gasoline work and it is well worth while to devote not a little extra attention to the installation of this part of the fuel system of any car, as a permanent and well-installed connection between the gasoline tank and the carbureter is one of the first requisites of satisfactory service from this essential of the car. A little neglect here invariably makes its presence felt sooner or later, though the trouble is often most difficult to locate.

In conclusion, it may not be out of place to point out that it is desirable to provide a means for draining the tank at frequent intervals, but it should not be possible for the gasoline to escape through the drain as the result of vibration. A cock is a little inclined to be troublesome in this way, and a plug is, on the whole, the safest thing to depend upon. But it is one thing to have a plug and quite another to use it, and the plug is of small benefit unless used.

THE INDICATOR DIAGRAM AND WHAT IT MEANS

By VICTOR LOUGHEED.

IN the periodical and advertising literature of the automobile industry, reference to "indicators," "cards," "diagrams," and "manographs" are becoming increasingly frequent, and though the terms are quite commonplace to the most indifferent engineer, they nevertheless must convey more of confusion than of information to the greater number of automobile owners, whose

technical training hardly averages deeper than the mere ability to pilot a car with a reasonable degree of success.

But the indicator, its relative the manograph, and its

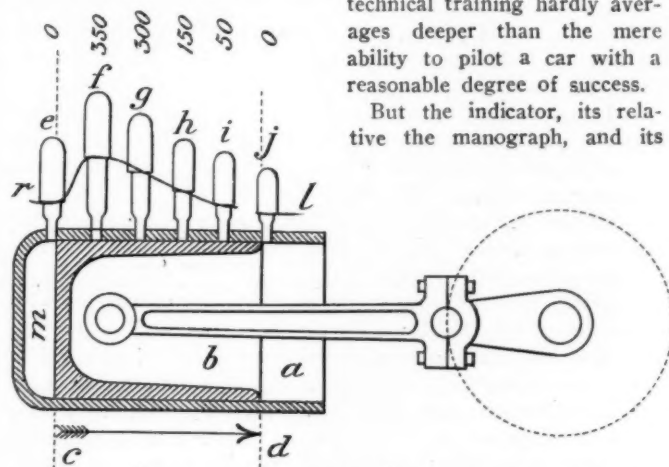


FIG. 1.—Illustrating the theory of the indicator as applied to the gas engine.

product the indicator diagrams, all relate as much to the fundamentals as to the abstrusities of automobile engineering, and there is little reason why a simplified exposition of its construction and purposes should pass any one's understanding. Beginning with elementary automobile engine principles, it is, of course, understood that the piston is impelled from one end to the other of its working stroke by the pressure of a mixture of air and fuel vapor highly heated by the reaction from a chemical combination (combustion) of its elements. This pressure is highest at about the commencement of the stroke, before the heat of combustion is partially lost into its surroundings, and before the pressure is reduced by the heat loss and the expansion permitted by the moving piston. The pressure is lowest at the termination of the stroke, by which time the available energy of the charge is utilized and it is ready to be exhausted, that its place may be taken by a fresh, unconsumed charge. At intermediate points in the stroke the pressures are of intermediate values, the drop occurring at a rate variously determined in different engines by the quality of the fuel, the timing of the ignition, the piston speed, etc.

Taking another leaf from elementary principles, it is pretty generally known—from the very definition of the term—that the horsepower of any given engine is the product of its piston area multiplied by the pressure in pounds upon it, multiplied by the working travel in feet per minute, and divided by 33,000. However, as has been pointed out, no internal-combustion engine operates with a uniform pressure throughout the stroke; it becomes necessary for purposes of calculation to take into account the number of working strokes in a given time, and to ascertain the "mean effective pressure" that substantially represents the total of the work done in each stroke.

To illustrate, consider the case sketched in Fig. 1. In this *A* represents the cylinder and *B* the piston of a horizontal automobile engine, the working stroke being accomplished to the right—from the dotted line *C* to the dotted line *D*—the piston head as shown being aligned with the line *C*, ready to commence a power stroke. The pressure at different points in the stroke, as it would be shown by a plurality of small maximum-pressure gauges *e f g h i j*, screwed into holes in the cylinder wall and uncov-

ered one after another as the piston progresses to the end of its stroke, would be about in accordance with the figures printed above each gauge, in an average engine. If the gauges could be infinite in number, this would give a curve for the pressure rise and fall closely approximating the dotted curve *r l*.

A little further reasoning quickly discloses the fact that a plurality of gauges is not necessary if with one gauge it is made practical to record accurately and positively all of the fluctuations in pressure from the beginning to the end of the stroke—so that it could be known, for example, that at the beginning of the stroke the gauge had registered zero, one-half inch further on had registered 350 pounds, by another half inch 300 pounds, and so on to the end of the stroke. Obviously, too, to use a single gauge it must be attached to the head of the cylinder, that it may be at all times in communication with its interior, instead of having to be uncovered by the movement of the piston. In this connection it is well to note that the arrangement of gauges shown in Fig. 1 would be necessary only to insure their proper successive action, and not because of any variation in pressure in different portions of the chamber *M*, which becomes larger as the piston recedes, while the pressure drops throughout it.

The conditions to be fulfilled by an indicating device being defined, its mechanical construction might reasonably appear to take the form sketched in Fig. 2, in which *A* is the cylinder, *B* the piston, *C-D* the stroke length, and *E* a pressure gauge permanently in communication with the combustion chamber *M*. Forming a part of the gauge, the plunger *N* is adapted to rise and fall in proportion with the pressure, from zero to the maximum that is likely to be encountered—a range that will be from the dotted line *O* to the dotted line *P*. In the *T*-shaped top of *N* the rod *Q*, carrying a pencil point at *R*, is arranged to slide horizontally from *C* to *D*, the stroke length of the engine, it being pulled through this distance by the string *S*, affixed to the light standard *T*, bolted to the piston. Behind the pencil there is firmly mounted the card *U*, wide enough and long enough to accommodate the full possible travel of the pencil, both vertically and horizontally. Everything being arranged as shown, it can be easily perceived that the dotted curve *R E*, similar to that indicated by the same letters in Fig. 1, must be generated by the compound movement imparted to the pencil by the pressure gauge and the spring.

The whole principle of the indicator having been explained, its practical application and the utility of the

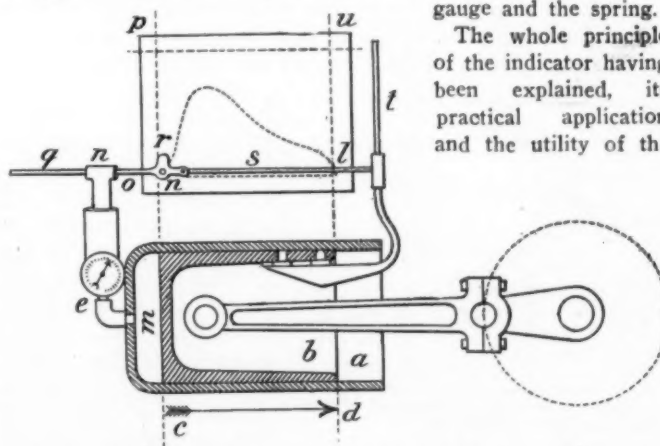


FIG. 2.—Crude form of gas-engine indicator, showing its component parts.

diagrams from it call for further comment. First, it must be understood that it is scarcely practicable to use on most engines so crude a contrivance as is employed to illustrate the principle in Fig. 2. In most indicators the dial portion of the gauge (*E*, Fig. 2) is omitted and all possible care in the design and construction of the device is de-

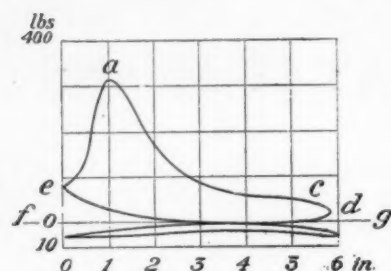


FIG. 3.—Specimen of typical gas-engine indicator card showing exhaust and compression.

engine. This is conveniently effected in most good indicators by wrapping the card about a cylinder, which is revolved to secure the horizontal traverse, while the vertical movement is by means of a multiplying action magnified into a more readable exaggeration of the plunger movement. Still another element involved by considerations of practical utility is some provision for automatically throwing the whole service in and out of action for one or some other predetermined number of strokes, while the engine is kept running at a uniform speed.

Several typical automobile-engine indicator diagrams are shown here. In each case these are made to occupy at least the full number of strokes required to complete the engine cycle. Fig. 3 is from a four-cycle engine, the top line showing the explosion, the next to the bottom line the exhaust, the bottom line the suction, and the next to the top line the compression stroke. This card is from an engine of the common type, working efficiently at its best speed, and its explosion line shows very clearly the enormously rapid rise of pressure after ignition, up to the peak *A*, from which maximum there is a gradual fall to *C*, where the exhaust valve opens, causing the abrupt drop to *D*. In the compression stroke the pressure is seen to rise at an increasing rate to *E*, where ignition occurs, and whence the rapid rise to *A* commences. It will be observed that most of the suction stroke and a portion of the compression stroke fall below atmospheric pressure, which corresponds to the line *F G*.

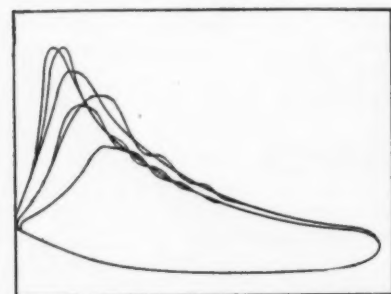


FIG. 5.—Several superimposed diagrams, showing effect of throttling.

The mean height of the explosion line of a diagram gives the mean pressure. From this is to be subtracted the negative work imposed during suction, compression and exhaust. For practical purposes, with a correctly adjusted engine, the power consumed in the suction and exhaust strokes is too small to be considered, leaving only the compression to be subtracted. The simplest way to realize this subtraction is to disregard the space below the compression line, leaving that between the compression line and the explosion line to be regarded as the "work area" of the diagram. This area, redistributed into a rectangle corresponding in length to the stroke, will have a height commensurate with the mean effective pressure, from which the power output of the engine can be readily calculated. In specifying a basis for horsepower ratings, the German Government

voted to securing accurate and positive working from the plunger portion, represented by *N* in Fig. 2. And instead of anything so frail as the rod *Q* and string *S* the better expedient is employed by moving the card *U* itself by means of a connection with the engine.

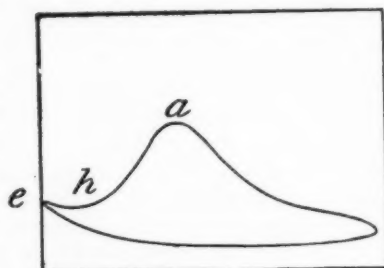


FIG. 4.—Illustrating the effect of late ignition on the power produced.

decrees that 55 pounds to the square inch shall be taken as the mean effective pressure in automobile engines. Few, if any, internal combustion engines of any type whatsoever have realized mean effective pressures as high as 90 pounds to the square inch.

The diagram Fig. 4 is from the same engine as is the preceding case, and is of interest chiefly because it shows how ignition delayed to *H* causes a lowering of the peak *A* and a loss of work area throughout the entire diagram. The failure of the explosion line to run directly back upon the compression line to *H* is explained by the absorption of heat from the cylinder walls. It is further to be noted in Fig. 4 that the scale of pressure at the left of the card and the scale of stroke positions across the bottom of it are not present as in Fig. 3. This is because the usual requirement is for data comparative only with respect to the different portions of the diagram itself, and not with regard to arbitrary scales of pressure and of stroke dimensions. The card shown at Fig. 5 shows how by a maintained application of an indicator a number of superimposed diagrams may be secured, showing most graphically just what occurs when an engine is throttled down.

At Fig. 6 the card shown is from a two-cycle engine, so there are only the compression and the explosion lines to be seen. A typical card from a steam engine is shown at Fig. 7. This card presents marked contrasts to the gas-engine diagrams. All strokes in both directions being power strokes, one complete revolution of the crankshaft produces the two reversed diagrams given. Moreover, the pressure is maintained at its maximum for nearly half the stroke, to a point at which cutoff of the admission occurs and is further accompanied by expansion of the motive fluid down to atmosphere.

Internal combustion engines of all classes have been for years regarded as most difficult subjects for indicator research, and until within recent years the application of the device has been all but confined to steam engineering. This has been because the pressure fluctuations within gas-engine cylinders are of such great amplitude, and occur with such suddenness and violence, as to make it almost impossible to devise mechanism with parts light enough to act as quickly as is required, and at the same time strong enough to withstand the shocks imposed.

As a matter of fact, practically all successful results in indicating gas engines have been obtained through the use of the strictly modern manograph—a modified type of indicator in which there is substituted for the pressure gauge a spring controlled circular diaphragm, which in conjunction with the piston movement exercises a compound control, in the form of vertical and horizontal oscillations, over a small circular mirror.

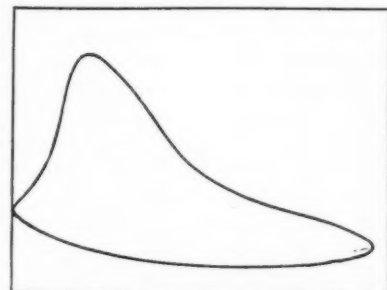


FIG. 6.—Indicator card from a two-cycle motor, omitting exhaust and compression lines.

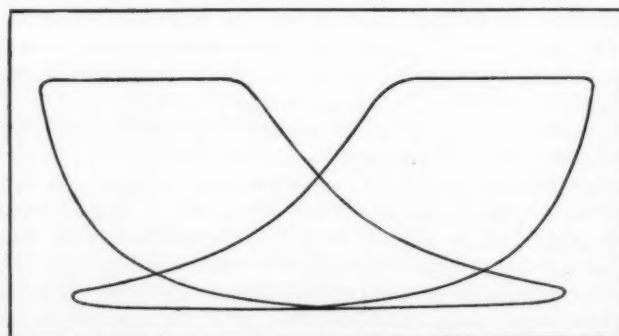


FIG. 7.—Typical double-acting steam engine, or "flat-top" card, illustrating how the pressure is maintained for a very large portion of the stroke.

A NEW STEP IN MAGNETO DEVELOPMENT

By ERNEST COLER.

THE observation that the average chauffeur seldom likes to "dope out" magneto ignition systems applies with even greater force to the owner, whose principal objects in making use of the motor car are the saving of time, the attainment of comfort and the pursuit of pleasure.

All repairmen will agree that even the well-paid and presumably more than ordinarily intelligent chauffeur, after a general overhauling job, experiences considerable difficulty in getting the magneto to function as well as it did before he laid his dissecting finger upon this part of the mechanism. Many chauffeurs who are able to solve the mysteries of the four-unit coil circuit are completely at sea with the average magneto. The new magneto systems to be described in this article are the invention of Robert Miller, M.E., of New York, another of whose inventions—the gearless friction transmission—was described in the issue of November 14; they are of the pure high-tension type and differ from other magnetos principally in that they are in frictional contact with and driven by the flywheel or by belt, and revolve, in one system, at a rate approximately six times faster than the engine. The number of sparks produced is six per magneto revolution, so that the total spark production is 36 sparks during each revolution of the engine. In this respect the arrangement corresponds somewhat to the action of a single coil, vibrating all the time and distributing the secondary circuit to the various cylinders.

If this sparking cycle be divided into the degrees of the crank cycle it will be found that they are spaced about ten degrees apart. Objection might be made that the ignition in a multi-cylinder gasoline engine thus operated would not be synchronous; that is, the moment at which sparking begins might be later than indicated by the distributor. Ten degrees, the maximum possible variation, is a very short distance measured in the length of the stroke, especially around the dead center. However, in comparing the Miller system with the four-unit coil system it will be seen that the action of the four coils is anything but synchronous; in other words, the four vibrators cannot be tuned alike, and there are inevitable variations, even greater than ten degrees, in the timing of the spark. Likewise in using the four-unit system with the modern addition of the master vibrator, it is easy to demonstrate that although the vibrator action is the same for all four coils, this arrangement lacks every guarantee that the four coils will be in equal electrical balance or continue so for any definite length of time.

With the use of the Miller magneto the engine is started in the usual manner by cranking, or the magneto may be rendered self-starting, as will be explained later. With the new magneto it is unnecessary to "spin" the engine in order to turn the magneto sufficiently rapid for effective sparking, because of the fact that even with a slow turning of the cranking handle the magneto will revolve much faster and will produce the desired ignition.

The magneto has a vibrator, condenser and low-tension coil for starting at slow speed only, and as the engine attains a certain predetermined speed these are cut out automatically and eliminate in this manner the necessity for continued use of the attachments. Simultaneously with the cutting out of the vibrator

the high-tension coil alone is used and acts as the simplest kind of high-potential alternating current generator, in which neither moving wires nor contacts are employed.

It can readily be seen that the operation of this magneto offers no problems whatever to the inexperienced driver, because the need for his attention is limited to seeing that the friction wheel of the magneto is in contact with the flywheel, and that the sparks occur under the glass cover of the distributor, which is made in the most approved style, non-wearing, with the contact points separated by a small gap. In fact, should sparks not appear at a distributor point it is evidence that either the corresponding plug or its connections are at fault.

The current is generated by means of inductor pieces fastened to a shaft running on Hess-Bright ball bearings, which require very little attention, being packed in grease. The magnetic core of the coil is bent around so as to come within the field of the inductor pieces. These inductor pieces, in revolving, change the magnetic flux through the coil, the magnetism leaving the magnet at the north end, going through one inductor piece, up and over through the iron core of the coil, down on the other side through the corresponding inductor piece, which leads it to the south pole, the flux varying at different positions. This is more clearly shown in the accompanying drawings.

With 36 sparks produced every revolution of a four-cylinder engine, the sparks are distributed so that one-half of them enter each cylinder during each explosion stroke, with the result that in the four-cycle type, even should the first spark fail to ignite the mixture on account of imperfect carburetion, etc., the next spark, coming only ten degrees later, is certain to fire the charge, because the charge itself has become hotter and more readily ignitable through longer contact with the hot cylinder walls. In this manner it will be impossible for the engine to pass unignited charges into the muffler, there to explode. The plurality of sparks also exercises a cleaning effect on the spark plug terminals.

The distributor is, in this case, made to time the 18 successive sparks for each cylinder of the four-cylinder four-cycle engine, or 12 sparks for the six-cylinder engine. Of course, it is possible with this magneto to use the ordinary type of distributor, in which a timer in the primary circuit controls the action of the secondary circuit, but the type illustrated herewith is simpler and less apt to get out of order. In experimenting with the new magneto Mr. Miller has made a series of trials and pro-

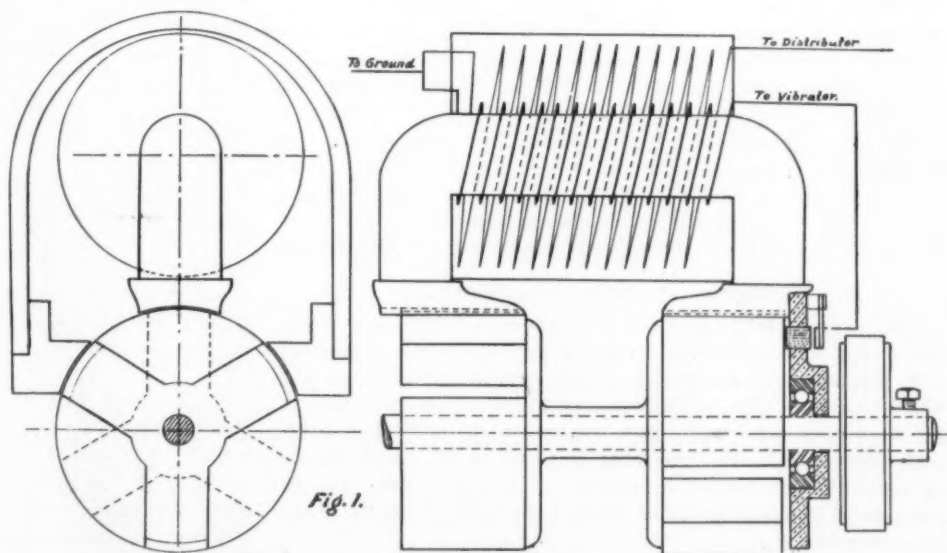


FIG. 1.—End and side elevations of the new Miller magneto, showing disposition of the windings.

duced many forms of inductor pieces and cores for the coils, in some cases going so far as to make the cores of a non-magnetic shell filled with finely divided or chemically reduced iron with which a quick magnetizing and demagnetizing action may be obtained.

The illustration shows that the coil is the same as used with battery circuits, having vibrator, condenser, etc. Although a safety spark gap is provided, in case of damage a new coil can be inserted quickly and at very low cost, doing away with the expensive pulling down of the entire magneto and rewinding of the armature. In Fig. 2 the magneto is shown altered, so that each limb carries a smaller induction coil, connected in series. The cost of the Miller magneto can be made alluringly low, and it may be placed even in the low-priced runabouts, a selling price of from \$30 to \$35 being probable.

The self-starting arrangement is as follows: The distributor, which, of course, is controlled by the hand lever on the steering post, is brought to the proper position, as is now done with the four-unit coil systems, and the magneto shaft is given several quick turns by means of a small spring motor incorporated in

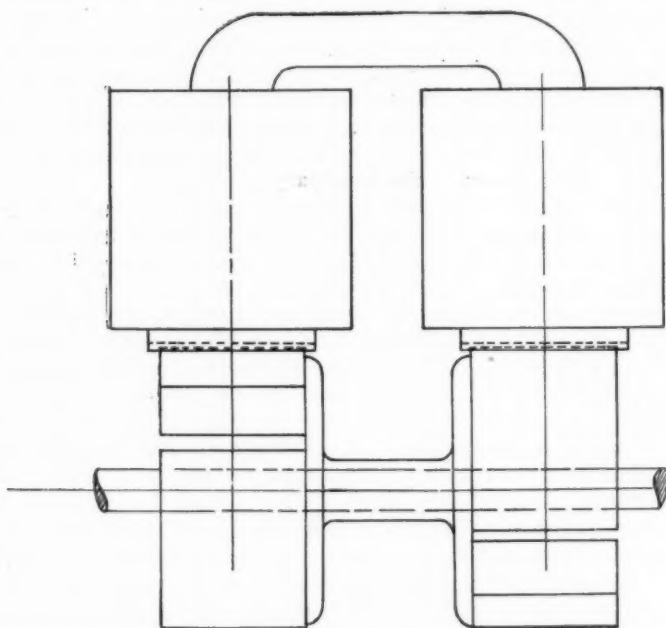


FIG. 2.—Illustrating arrangement of windings in proposed modification of generator, each pole carrying a separate coil.

the hub of the friction wheel. The spring motor is wound by the action of the engine; to self-start, it is released, to be re-wound as the engine takes up its motion. Another alternative is to give the magneto shaft a couple of quick turns by means of a multiplying device placed on the dash. Spark advance and retardation is taken care of by altering the position of the distributor, as is now done with the low-tension timers used in the multiple-unit systems. Of course, where occasion demands, the placing of the coil in relation to the magneto or to the inductor pieces could be changed; it is believed, however, that the arrangement shown offers many advantages over the usual placings.

A Highly Interesting Modification.

The objection might be made that for small cars of low power the device described in the foregoing would consume a measurable proportion of the power output; although the sparks are more numerous than in the ordinary magneto, yet the magnets are so proportioned as to give only about the equivalent magnetic saturation to the core that is given in the usual battery systems. The electrical pressure in this system is the result of the rate of line-cutting rather than of the intensity of the magnets themselves.

To overcome this objection, Mr. Miller has modified his de-

sign somewhat, with results even more interesting than those already enumerated. The same general scheme of stationary wires, with revolving inductor pieces, is used, but the rate of speed is confined to a maximum of 2,000 to 2,500 revolutions a minute; the friction wheel in this case is smaller and controlled by a governor such as is much employed on small dynamo sparkers. The result is that only a few sparks per engine revolution are produced, of a correspondingly greater angular variation.

To insure proper timing of this system, the high-tension wires feed into a Leyden jar set in the magnet arch above the coil, and are there held until this jar is discharged by the distributor. In order to make it possible for the Leyden jar, which is a modified condenser, to be charged and yet not discharged as the current potential falls away, what is essentially an *electrical check valve* is interposed in the circuit.

The coil generates current up to about its maximum pressure; connection is made with the Leyden jar, which becomes charged; the connection is then broken, and as both coil and jar are of the same potential no current passes from the jar. At the proper moment the distributor rotor on the engine gets in position and makes a path through which the jar can discharge.

Those familiar with the rapidity of the discharge oscillations of the ordinary condenser, as used with the primary windings in induction coils, will appreciate the impulsive force with which the Leyden jar discharges itself. Such impediments as soot, oil, water, etc., on the spark plug points have no influence whatever on the action of this spark; even external short circuits of a moderate extent are powerless to divert it from its proper path. This is due to the enormous difference in the discharge rate of the high-tension coil and of the condenser; it has been estimated that the latter discharges at a rate of from 1,000 to 4,000 as great as the former. We have here, in fact, the action of the lightning stroke on a small scale. The entire coil, with connections and Leyden jar, can be sealed up in paraffine or pitch, so that only the weather-proof spark is exposed. Instead of glass, other insulators, not liable to breakage, can be used.

Of course, the first system is simple and perhaps more adapted to be used by the unskilled driver; yet it is clear that the latter system possesses a number of distinct and noteworthy advantages.

TO THE MAKING OF THE MOTOR MECHANIC.

Austrian automobilists are watching with much interest a project which promises to provide efficient repair shops and skilled workmen for making automobile repairs throughout the country districts, facilities which have hitherto been sadly lacking outside of the cities and towns. The Auto Technical Association is organizing a training school for automobile repair work in the rooms of the Handicrafts Exhibition. It is especially intended for country blacksmiths, locksmiths and other mechanics with a knowledge of machinery, and, besides helping to provide automobile repair shops in country places, the school will open up a new means of livelihood to these workmen, many of whom have lost a good deal of their original business through the introduction of the automobile. The school will be completely equipped with tools and all requisites for the work of repairing cars. The course of instruction will last four weeks. Special provision will be made for the admission of workmen in poor circumstances by the grant of a small pecuniary compensation for the time spent in the school.

Widespread use of the automobile in cities has been accountable for a change in the habits of more than one city dweller, but neither the inherent keenness of vision nor the great agility of its feathered denizens who find their living in the streets is quite able to cope with the car's silent and rapid approach, and the result is more than one dead pigeon that could easily have escaped the swiftest horse.

LETTERS INTERESTING AND INSTRUCTIVE

IS THIS FAULTY CARBURETER ADJUSTMENT?

Editor THE AUTOMOBILE:

[1,057.]—In your issue of December 12, I notice letter No. 1,012, which case I believe applies somewhat to my car, which is a two-cylinder (Buick), which I have great trouble in starting, despite the fact that after it is in operation, it runs very smoothly and has very high power. The carbureter is a Schebler, which is at the end of a piece of brass tubing, close to the end of the engine. This tubing has a drop of 6 inches in a 2-foot length, terminating in a "Y," which branches off to two tubes, one running to each cylinder. There is a drip hole at the bottom of this "Y," and oftentimes, no matter how carefully I set the carbureter, clean gasoline will drip out of there. I have been bothered with it more or less for some time, as it seems impossible to get it accurately set so that it will give satisfaction at all speeds, so that I am compelled to throw the gasoline off at the bottom of the tank every time it is used, to prevent it running down the pipe and leaking out of the drip hole. This is despite the fact that I have adjusted the carbureter very carefully and it does not begin to leak for some time after the engine has stopped. As the "Y" is directly under the flywheel, it would be a very bad place to locate the carbureter. In fact, there is hardly any place in which the carbureter could be located where it could come lower than the "Y" and be accessible. If you can advise me of a new way to pipe up the intake so as to do away with this, I shall appreciate it. The machine is a Model F Buick, of 1906 make, and has given absolute satisfaction in every way but this, often showing more power than larger four-cylinder cars with much more powerful engines.

R. S. HILL.

Louisville, Ky.

In view of the fact that large numbers of the type of car you mention are in daily use, it would seem quite probable that if the trouble you complain of were due to an inherent defect in the design, such as would require the replacement of the intake manifold, complaints on this score would be more common. On this account it seems more than probable to us that you will find the fault in the adjustment of the carbureter. If gasoline begins to drip out, even though only after the engine has been stopped for some time, this would indicate that the float level is too high, thus permitting the gasoline to overflow the moment the fuel reached it. The constant demand upon it by the engine while running prevents it overflowing at other times. The fault may not lie so much in the adjustment as in the fact that the float may have become loggy, if cork, thus sinking somewhat and raising the gasoline level to a corresponding extent. As you are located in a large city, you should be in a position to get in touch with other owners of the same make of car and ascertain if they have the same difficulty. Also consult the agent of the car and look at later models of the same car, to see if the manifold arrangement has been altered in any way. Even the designer only learns by experience where many of these details are concerned and if the trouble has been due to faulty design you will doubtless find that it has been modified to suit the requirements. The maker will also doubtless be glad to be of assistance, if you write the factory stating the nature of your trouble. The same effect is frequently due to totally different causes, so that it is not always safe to jump to the conclusion that the same remedies will be equally effective.

The difficulty in starting may be due to any one of a number of different causes, but judging from the outline you give an overrich mixture would appear to be responsible. The liquid gasoline collecting in the drop of the manifold fills the latter with practically pure gasoline vapor, which will not ignite even under the most favorable circumstances. There is so much of this vapor present that cranking several times does not suffice to clear the passage and introduce enough air to form a mixture. As soon as the cranking ceases for a few moments the manifold refills, thus maintaining practically the same condition. There should be a stop cock placed in the gasoline line from the tank to the carbureter so that the supply could be shut off at any time. This would avoid the necessity of emptying the tank.

LAYING UP STORAGE BATTERIES IN WINTER.

Editor THE AUTOMOBILE:

[1,058.]—Will you kindly tell me in your next issue which is considered the cheapest and best way of taking care of Vesta storage battery for the winter? The garage in this city tells me to saw the plates apart. It is all Greek to me, but I understand it is practically tearing the battery to pieces and soldering it together again in the spring. On the other hand, they want to charge a dollar a month to store it and run it down. I don't find the battery advertised in your journal and do not know where their factory is, so therefore write you for suggestion.

Duluth, Minn.

DR. F. C. LEE.

It is evidently worse than Greek to the garage keeper who advises you to saw the elements to pieces. This would practically mean ruining the battery, as it would have to be returned to the makers to have the connections burned together again. They are joined by lead burning, not by soldering, and we cannot conceive where the garage keeper got his idea that it was necessary to disconnect the plates. The charge for storage is likewise excessive, unless it be intended to recharge it every fortnight, which is one method of keeping a battery. Where this is not convenient it is not a difficult matter to take it out of commission so that it may again be used in the following spring with little or no trouble in reassembling. First, have it fully charged and then remove the elements from the jar and separate them. That is, lift the positive group of plates away from the negative. There is always one more plate in the negative than in the positive group, though they may be readily distinguished otherwise by the marking of the elements with minus and plus signs, respectively. After charging and removing from the jar, wash the positive thoroughly in clean, soft water and allow it to stand immersed for an hour or so in order to be certain of removing all the electrolyte. Do the same with negative, and when dry the positive element may be stored in any convenient place where it will not come to harm—preferably in a cool and dry situation. Should the negative become warm and steam while drying, rinse in water again. When thoroughly dry, the negative should again be immersed in the electrolyte of the proper specific gravity, i. e., 1.275 to 1.3, and allowed to remain for several hours, care being taken to see that the plates are entirely covered. It should then be lightly rinsed in water, dried and stored, the same as the positive. The separators and other small parts of the cells should also be thoroughly cleaned in soft water and put away after drying. Where worn or cracked, as in the case of wood separators after long service, it is advisable to replace them.

CONCERNING A NEW DRAGON ROADSTER.

Editor THE AUTOMOBILE:

[1,059.]—I inclose herewith small drawings of a Dragon Roadster, which I recently purchased at the Chicago show. I am particularly anxious to find out what the horsepower rating under the A. L. A. M. would be. At the given weight of this car, will you kindly advise whether or not you should have this car geared 21-2 to 1, or 3 to 1, in view of the fact of its having but two speeds and would be used here in St. Paul where we have a number of grades for daily use of from 9 to 12 per cent.?

St. Paul, Minn.

DRAGON.

The indicated horsepower of the engine of the car you mention, as calculated under the A. L. A. M. formula, is 36.4 horsepower. We should recommend the 3 to 1 gear ratio as being better suited for all-around work, particularly in a hilly district, and more especially in view of the fact that there are but two forward speeds. The power of the car is high for its weight and should enable it to mount pretty stiff grades on the direct drive and at quite a speed. As a 32-inch wheel covers approximately 8.3 feet per revolution, it would give the car a speed of about 31 miles an hour at 1,000 r.p.m. of the motor, or 46 to 47 miles an hour at 1,500 r.p.m., with a 3 to 1 gear ratio.

Raising the latter to 2.5 to 1 means that the road wheels would make a complete revolution, omitting all considerations of lost power or road slip, for every 2 1-2 turns of the crankshaft, which would give the car speeds of 38 and 57 miles an hour, respectively, at the different motor speeds mentioned. It will be evident that these speeds are excessive for any ordinary requirements and there would be few opportunities to use them with safety, while they would, moreover, make the car too speedy for city work, which would mean that the motor would have to be run throttled down continually or the clutch slipped. In other words, it would require more manipulation to handle the car in traffic. The lower gear ratio, *i. e.*, 3 to 1, would permit the motor to be run at a better speed and would not impose as severe service on it in the long run.

AN EXPENSIVE REMEDY FOR CLUTCH TROUBLE.

Editor THE AUTOMOBILE:

[1,060.]—I have been having considerable trouble with a slipping clutch, which is leather to metal. I am informed by my machinist that this has two causes.

In the first place, that there is not thick enough leather on the clutch, and, therefore, it gets very hard, and, secondly, that the clutch is too much cone-shaped, and that if I lessen the cone it will grip better. He explains that this can be done by turning 1-8 of an inch off the smallest diameter of the flywheel, and building up the leather on the clutch. The clutch now has a 4-inch bearing surface, and in that 4 inches there is a cone of 1-2 inch. He suggests lessening this to 3-8 inch. Is he right in what he says?

On the cardan shaft of my car, between the clutch and the gear box, there are two movable joints, which, if they were placed at right angles to one another, would make a universal joint, but I note that both joints move in the same direction, that is, the axles in both joints are either pointed to the right and left, or up and down, both being in the same position at the same time. Surely there has been a mistake on the part of the man who assembled it, and these two joints should be at right angles, so that when one is moving from right to left, the other could move up and down.

The two joints I alluded to are (as I said) between the clutch and the gear box, and about one foot apart. There are two similar joints behind the gear box, between it and the differential, and they are exactly in the same relative positions, that is, the axles of both joints are always pointed in the same direction. I conclude that those are also wrongly assembled.

I will be very much obliged for your opinion on this matter, as I think there has been a mistake made in the assembling of the shaft, for they have no resemblance to a universal joint in the position they are now in.

I am advised by a French driver that neatsfoot oil is better for use on leather than castor oil, that is, that it softens the leather better, and is less of a lubricant. Is he correct?

Toronto, Canada.

CHAUFFEUR.

Before adopting the advice of the chauffeur it would be advisable to consider the matter from every point of view. If his suggestion be correct, then it must be inferred that the clutch was poorly designed from the outset and never was right. Your experience with the car should enable you to answer this one way or the other. If you have had trouble of similar nature ever since you have had the car, then it would appear that probably the design was at fault. But if the car performed satisfactorily for a considerable period of time and has only been giving this trouble more recently, would it not seem to be jumping at an unwarranted conclusion to decide offhand that the design was wrong? We see nothing radically wrong in the figures you mention and while turning the conical face of the female member of the clutch down to an easier angle might effect a more gradual engagement it will not prevent slipping, other things remaining the same. Hence we do not agree with your driver. Building up the leather is only a makeshift and will not prove satisfactory. In fact, it is much more apt to prove otherwise, for reasons that will be obvious.

That the leather gets very hard does not necessarily prove that there is insufficient of it on the clutch to do the work. It merely goes to show that the clutch is frequently slipped, as it is the friction created that hardens and polishes the leather. How about the adjustment of the clutch itself and its seating spring?

If the leather facing appears to be too thin, moving the clutch slightly further into engagement and strengthening the compression of the spring should afford a remedy. If this trouble with the clutch be chronic, and not due to poor adjustment or poor driving, we should advise doing away with the leather facing entirely and substituting cork inserts, thus making it a metal to metal clutch. This would be far more satisfactory and doubtless far less expensive than the remedy your driver suggests. Regarding the question of oils, we have had no experience with neatsfoot in this connection and cannot advise; castor oil is very largely employed for making leather belts adhere to metal pulleys in factories and shops.

We find it impossible to recognize the particular type of universal that you refer to from your description, nor do you state whether the car has just been reassembled after dismantling or whether it has been run with the joints in this condition. Can neither your driver nor the garage attendants tell you whether the joints have been wrongly assembled or not? Reference to the maker's instruction book should shed some light on the matter.

THAT HARDY PERENNIAL ONCE MORE ON DECK.

Editor THE AUTOMOBILE:

[1,061.]—Will you please let me know through your columns if the inside or outside wheels of an auto taking a curve at great speed leave the ground? Does the same apply to a locomotive?

New York City.

TIMOTHY P. GUINEE.

The inside wheels of any four-wheeled vehicle tend to leave the ground when rounding a curve at high speed for reasons that must be plain on a moment's consideration. It is on this account that the outer rails of a track are elevated. Assume a vehicle, such as an automobile, to be traveling at high speed in a straight line. The car, with its load, weighs 4,000 pounds, or two tons, and is traveling at the rate of fifty miles an hour. It will be evident, then, without going into the mathematics of the subject, that the force represented by this traveling body is little short of that of a huge projectile which has just left the gun; and it must be evident that this tremendous force, thus exerted in a straight line, cannot be turned from its path in violation of natural laws without serious consequences. In other words, the moving body has a very strong tendency, proportionate to its speed and weight, to continue traveling in a straight line, and in order to take a curve safely it must be counteracted to a point where there is no danger of the inside wheels of the vehicle leaving the ground to an extent that would make overturning imminent. Consequently, curves are banked and speed is reduced in rounding them. The effect of the former is to bring the center of gravity of the moving body on a line with the inside wheels, thus concentrating the entire weight on that side to prevent its being lifted by centrifugal force. The most common manifestation of the action of the latter is to be seen in the manner in which the passengers are moved bodily toward the outer side of the car in a train rounding a curve at high speed. There are some autoists who are quite certain that they have seen the outer wheels of an automobile leave the ground when it was rounding a curve, and who stick to their theory of the matter despite all explanations to the contrary, but they doubtless never paid any attention to this action while riding in a train or in the tonneau of an automobile, where it is very much more pronounced.

TROUBLE WITH A LEATHER-FACED CLUTCH.

Editor THE AUTOMOBILE:

[1,062.]—I have been a subscriber to your publication for several years and shall appreciate your advising me through your "Letters Interesting and Instructive" as to the following: In the timing of an engine, I thoroughly understand that if the two to one gear is slipped one cog either forward or backward, it will change the timing of the engine, either later or earlier. If this is done, can the correct timing be made again with the commutator, pushing it forward or backward? I am having some trouble with the cone leather-faced clutch, it engaging too much. It

has three spiral springs in the male part of the clutch, which press upon the leather when engaging in the flywheel. I put three thin pieces of brass under each spring, thinking to remedy the trouble, but it made them worse, so I took it out, but I still have the trouble with the clutch catching too quick. I have tried oiling the leather with ordinary lubricating oil, but it seems to have no effect. I, however, note in one place that the spring is worn through the leather. Would this cause the fault, or would you advise relining the clutch? How would three cork inserts do?

J. G. S.
Louisville, Ky.

Upon a little consideration of the matter, it will be apparent that the relative position of the contact in the timer, with reference to that of the piston of the cylinder to which it corresponds, is the essential aimed at in timing the ignition of a motor. Consequently, it is immaterial whether an alteration in the relative positions of these two parts be brought about by altering the relation of the driving gears, or the position of the timer itself on its shaft, so that moving the latter will naturally compensate for shifting the gears.

It seems evident that the fact of the springs having worn through the leather facing is responsible for the rapidity with which the clutch takes hold, as these points are naturally higher than the remainder of the male member of the clutch and consequently come in contact with its seating sooner than intended. Cork inserts would be far preferable to merely relining the clutch, as it was previously, and would improve the action and service of the clutch in every way. We should advise corresponding with maker of the car, or the manufacturers of the cork inserts before proceeding.

ENGINE WITH UNJACKETED HEADS RUNS HOT.

Editor THE AUTOMOBILE:

[1,063.]—I have a two-cylinder horizontal 5 by 6 engine in my automobile, which will fire three or four times after running awhile when the switch is cut out with the throttle partly open. These cylinders are water-jacketed on the sides only; the heads of the cylinders are not water-jacketed. Please answer in your columns whether or not it would remedy this trouble by putting on copper water-jackets on the heads of these cylinders. It is not on account of carbon in the cylinders that it fires without the spark, for it will do it after cleaning out the carbon.

New Castle, Pa.

FRANCES CORNETTE.

As many of the old-time motors with unjacketed cylinder heads have seen years of service, it appears to be jumping at conclusions to decide that the fact that this part of the motor is not water-cooled, is entirely responsible for the trouble. How about the performance of the motor when you first got it? Did it not run without overheating then? Naturally it is much more difficult to prevent a motor of this type from overheating, but if the engine has ever performed satisfactorily for any length of time it would seem that the latter, and not the design, was responsible. Placing copper water-jackets on the heads might prevent firing from pre-ignition through overheating, but it would not remedy the cause of the latter. See if some one or more of the numerous reasons that bring about this state, such as an overrich mixture, improper timing, poor cooling-water circulation, or the like, are not in evidence. Such a motor has to be kept in better condition to prevent overheating than one in which the efficiency of the cooling system is so high as to overcome these irregularities. It would be preferable to remedy the trouble first, even if the copper water-jackets were added.

THE FUNCTION OF THE TREMBLER.

Editor THE AUTOMOBILE:

[1,064.]—In various books and articles on the subject of automobiles, it is stated that the function of the trembler, or vibrator, commonly used in connection with the coil of a high tension ignition system, is that of producing a rapid succession of discharges of electricity across the terminals of the spark plug during the moment of contact. Now a fellow driver tells me that there is nothing to this but theory, and that the trembler makes only a single spark, he says, due to the rapid succession of power strokes within the cylinder. I contend that this is not the case, else why does the vibrator make the same buzz at all engine speeds. And I

am getting sure I am right, but for the sake of having some documentary evidence on the subject, I would appreciate seeing your opinion published in "Letters Interesting and Instructive."

Paducah, Ky.

CHRIS. OLDHAM.

Your friend is partly right and partly wrong. The function of the trembler is not to produce a rapid succession of sparks at the plug during the ignition contact for a single stroke, but it does, of course, make more than a single vibration during the moments of commutator contact. The fact that the vibrator will continue to act indefinitely when the circuit is closed and while the current lasts is proof enough of this. The "rapid succession of sparks" theory, however, is pretty generally conceded to reduce itself to this: No trembler blade, as ordinarily made, and under ordinary conditions, can be made to work much faster than 200 vibrations a second and 1/200 second is time enough for the piston to move so far—at all but the very lowest speeds—that the second spark cannot be of much use if the first fail to produce ignition. For instance, sparks occurring 1/200 second apart are 18° apart on the crank circle at 600 revolutions a minute, and proportionately farther on closer at higher or lower speeds. Moreover, the speed of vibration as realized in actual practice, especially with run-down batteries or poor adjustment, is apt to be very much slower than 200 a second.

ABOUT THE USE OF OXYGEN ON RACING CARS.

Editor THE AUTOMOBILE:

[1,065.]—In one of the late numbers of one of your contemporaries, I noticed an article on the use of oxygen for spurts in racing, in which they seemed to have no ill effect upon the motor; however, I have often heard that it quickly wears out the connecting rods and wrist pin, owing to the increased force of the explosion. Which of these is right?

Boston, Mass.

INTERESTED SUBSCRIBER.

It must be borne in mind that, in racing, the life of the car is a factor that is never taken into consideration. It is built to attain the greatest speed of which it is possibly capable and the fact that its life may be exceedingly short is never taken into consideration. Hence the ultimate effect of expedients which will aid it in fulfilling its mission do not enter into the question at all. They will make it run faster and that is all that is wanted. In skilled hands, oxygen can doubtless be employed to great advantage without seriously shortening the life of the motor, but that "it seemed to have no ill effect on the motor" is hardly conclusive. This simply means that it did not ruin the motor then and there, though this was one of the risks incurred by its employment. Increasing the force of the explosion considerably beyond that for which the motor was designed can only have one effect, and that is to wear it out sooner, if it does not end its career suddenly.

CONCERNING HORSEPOWER AND LUBRICATION.

Editor THE AUTOMOBILE:

[1,066.]—Give horsepower of my R. E. O. 1907 car double cylinder, 4 3-4 bore, 6-inch stroke. Also please tell me the best make of oil to use on same machine. Have been using Vacuum mobiloil, but if there is anything better, I want it. How about Havoline oil? Have a letter from that company giving it a very good recommendation.

Angola, Ind.

HARLEY H. WEBB.

The indicated horsepower of the two-cylinder horizontal opposed motor of the Reo car is 18, at a speed of 1,000 r.p.m. That is, this is its output based upon its dimensions. We have no doubt it does as well as this on a brake test, if not better. The oils you mention both have an excellent reputation in the market and are very largely employed. Write to the makers of the car and ascertain which particular brand they recommend, as manufacturers frequently specify certain oils which they know from experience will give good service in their engines.

SOME QUERIES ON VARIOUS TOPICS.

Editor THE AUTOMOBILE:

[1,067.]—Being a subscriber to your valuable paper, I desire to ask you some questions through your columns. Tire chains, I

believe, absorb more power than the leather type of studded anti-skids, but you can inform me if the Midgley tire treads would take as much power to operate as a regular rubber shoe which is smooth. Can you think of any engine with a two-cylinder vertical engine and sliding gear transmission with shaft drive? Either two or four-cycle? What metal would you recommend for the engine bearings of a 1904 Franklin? Would babbitt answer?

New York City.

FRANK ALDEN MILLER.

While we have no data at hand, nor are we certain that there is any extant, we should say that on a smooth road tires with Midgley treads would consume slightly more power than smooth treads owing to the coefficient of friction being higher. But for the same reason, under adverse conditions, the wired tread would probably waste less power through slipping than would a smooth tread, as on a greasy or slippery surface.

The Renault small cars answer this description, and there may be one or two others, though we do not recall them at the moment. This car is made in France, and the engine is of the four-cycle, water-cooled type using thermo-syphon circulation. Babbitt metal would doubtless answer for relining the bearings of the car you mention, though the makers may have some special alloy which is superior, and which they would be pleased to supply on request.

OIL FOR USE IN A COOLING SYSTEM.

Editor THE AUTOMOBILE:

[1,068.]—I would like to inquire whether or not the common kerosene or lamp oil can be safely used in the cooling system of a Reo two-cylinder car. I know of a number of parties who are using oil in the cooling system during the winter weather, and as it does not freeze, I would like to try it if practicable.

East Liverpool, O.

WALTER B. HILL.

Common kerosene oil would be far from suitable to employ as a cooling agent in the radiator of a car, as a moment's reflection should show. Even the best grade of lamp oil only has a flash point of 150 degrees Fahrenheit, what is usually known as "150 test oil." As the temperature of the cooling water of a car is more frequently above this point than below, when it is in use, it must be evident that kerosene would be rather a dangerous thing to have around under such circumstances. Ordinarily, a lighted match dropped into kerosene would be extinguished, but at this temperature and above it the result would be a blaze, the seriousness of which would be aggravated by the vapor arising from the kerosene when thus heated. We do not know exactly the grade of oil employed by manufacturers of oil-cooled gasoline engines, but presume it is a good grade of machine oil, of light body and high flash point. Another disadvantage of kerosene is that of its low boiling point, which would cause it to boil away very rapidly, even though the motor ran without overheating.

WHAT IS WRONG WITH THE THREE-CYLINDER?

Editor THE AUTOMOBILE:

[1,069.]—Will you kindly advise as to whether, in your opinion, a three-cylinder, two-cycle engine is an undesirable proposition? A friend of mine tells me that three-cylinder engines have always proven failures. I would like to know the objections to such, if you would be kind enough to state them.

Will you also advise as to whether, in your opinion, it is detrimental to make a practice of running on the street car tracks on city pavements?

C. C. BLANCHARD.

Providence, R. I.

As the two-cycle engine fires every cylinder on every downward stroke of the pistons, a three-cylinder, two-cycle engine with the crankpins set at 120 degrees, makes a well-balanced and very smooth-running engine. We have never heard of such engines being failures. Doubtless your friend refers to the four-cycle type, in which a better balance is obtained with four cylinders than with three. The practice of constantly running on street car tracks concentrates wear on the tires at their weakest point—the sides of the tread—and this naturally tends to shorten their period of service, as tire makers will testify.

WHAT FRICTION TRANSMISSION IS THIS?

Editor THE AUTOMOBILE:

[1,070.]—Some time ago I read an article in "The Automobile" descriptive of a new friction drive which has been put on one of the 1908 cars. I would like, if possible, to get a copy of this description and would be pleased if you would let me know how I can obtain the same.

CHARLES CHIPMAN.

Easton, Pa.

In the issue of THE AUTOMOBILE of May 9, 1907, there was published, on page 788, a description of the Gearless transmission, which is practically a planetary change-speed gear, utilizing friction members instead of the customary spur gears. This was the only special reference to a friction gear that represented any radical departure from standard practice in this respect.

SUPPLEMENTING MR. POWELL ON IGNITION.

Editor THE AUTOMOBILE:

[1,071.]—The letter of E. Leeds Powell, No. 1052, in your December 26 issue, raises the question whether it is in the end more expedient to meet the principal objection to the dry battery as a source of ignition current by providing a larger source of supply, or by using the current more economically. Mr. Powell says very correctly that to ignite the mixture requires a hardly measurable amount of energy, the obvious reason being that only one spark is required to do the work if the mixture is anywhere near correct. Consequently, if the demand on the battery were limited to furnishing this one spark for each ignition, the battery ought to last long enough to satisfy the most exacting. The only reason for using a storage battery is to furnish cheaply a large supply of current to be wasted in unnecessary sparks, and the storage battery performs this service fairly well when it is in order, the worst objection to it being that the average inexperienced owner never knows whether his storage battery is in order or not, until it is down and out. If there were no current wasted, there would be hardly any reason for using the storage battery.

The makers of magnetos are attacking the problem from the standpoint of furnishing more current than is necessary, in order to be sure to have enough, and most magnetos absorb far more mechanical energy than is converted into electricity, so that mechanical wear and tear is the natural result. If a magneto could be built to furnish just current enough, and furnish it efficiently, it would be ideal; but the current depends on the speed, and to be sure of having current enough at low speeds, the magneto must be large enough to furnish a great excess of current at ordinary to high speeds, and all this is wasted. There is certainly need somewhere of a better ignition system than those in common use.

New York City.

HERBERT L. TOWLE.

AN EXPLANATION OF DR. TUTTLE'S TROUBLE.

Editor THE AUTOMOBILE:

[1,072.]—While reading your valuable paper, "The Automobile," I noticed one of your reader's difficulties, that of Dr. Edward G. Tuttle, letter No. 1,028. I have had the same experience which he describes while repairing and putting into commission a motor boat this last June. The particles which he refers to are of shell-like substance and come, as he says, from the tank. This tank which I refer to was made of galvanized iron and is called charcoal iron, a good many tinsmiths making their tanks from this charcoal iron. This charcoal iron has a peculiar scale which gasoline in time will eat and it then floats around in the tank in small scale-like particles. I had this same experience happen on an automobile which I was repairing, these same particles clogging up the intake pipe and making the motor skip and miss as if there were short-circuited plugs on the engine. The remedy I used was to get a tinsmith to make heavy-gauge copper tanks for them. Of course, the cost of the copper tanks was about double the galvanized iron tanks, but the boat and the auto have been running since they were put in without any trouble to their owners.

Salem, Mass.

C. E. G.

WANTS GOOD TOURING MATERIAL PRINTED.

Editor THE AUTOMOBILE:

[1,073.]—I read with pleasure your "1,000 Miles in New England," and in a later publication of "The Automobile" I read George A. Fay's letter about it, which you headed: "What One Autoist Wants to Have Printed." I wish to say that as far as I can learn a great proportion of American autoists are interested in articles like the above named, at least a great proportion of the autoists in this locality are, as I have heard quite a number discuss it since the trip has been published.

GEORGE H. WALTERS.

East Orange, N. J.

COMBINED SPARK PLUG AND PETCOCK.*

"Still another spark plug, you say! When shall we see the end of the stream of accessories of that type that are always making their appearance; always the same, and which are presented to us in as many different forms as there are dress-makers in France?"

"Quite so, yet another spark plug. But, then, what a spark plug! Its inventor, in creating it, certainly made no pretensions to bringing forth something superior, where the ignition itself is concerned, than that which already exists in the highest forms. If that had been his object he could not have produced anything better than the best plugs, and these are already legion.

"But in observing the new Eyquem plug you will note at a glance the incomparable advantages that it presents over others—advantages so striking that you will be unable to resist the desire to give it a trial, and we may note in passing (a fact that is of considerable bearing on the matter) that it is no more expensive than a good, self-respecting plug of any kind. Its



EYQUEM COMBINED PLUG AND PETCOCK SHOWING CONNECTION.

chief advantage is to be found in the fact that it may be cleaned automatically by the fresh gas in the cylinder. The button shown at the right in the illustration forms the handle of a petcock, and, the body of the plug being pierced from end to end, the gas can blow through it when the handle is turned to the position shown in the photograph, thus cleaning it out very effectively.

"But that idea is not novel and its introduction has not been attended with the great success which was confidently anticipated for it, as the burning gases in passing through the porcelain insulation always endangered the latter. Where, then, is the invention of M. Eyquem?"

"It is to be found in the small piece of wire which will be noticed sticking down from the metal shank of the moving part of the petcock, and which, as shown in the illustration, comes in contact with the body of the plug when the petcock is open. In this manner the current is short-circuited at that plug the moment the petcock opens, so that the gas which is forced out of it is fresh and charged with gasoline. In consequence there is no danger of breaking the porcelain, for the reason that everything is cooled off and the cleaning is perfect. Here is an advantage of the new plug that will be appreciated by chauffeurs.

*Translation from *L'Automobile*, Paris, by Charles B. Hayward.

Instead of having to dismount the plug to ascertain its condition, it is only necessary to open the petcock to a point where the wire extension comes within about a millimeter of the body of the plug. If the spark jumps it shows that the plug is all right and that the trouble must be looked for elsewhere. If it fails to pass, there is something wrong with the plug and it should be changed. It also provides an easy manner of hunting for a troublesome miss, as the current may be short-circuited on the plugs successively and by opening all the motor may be left so that it cannot be started. It also serves as a priming cup.

ON BALL-BEARING GASOLINE MOTORS.

My objections are based on the terrible jobs that we have with ball bearings on nearly every make of car, says David J. Smith in the *English Mechanic*. Ball bearings should not be placed in positions where they are subjected to shock. As soon as a little wear has taken place (ball bearings do wear, in spite of statements to the contrary), a slight hammer action is set up. In time, this either chips the hardened faces of cup or balls, or produces a slight flat on the balls. As soon as this occurs, the end of that bearing is near, and in a short time those balls resemble pieces of lump sugar in shape. No makers in the first rank are, to my knowledge, using ball bearings in their engines. When the internal combustion engine can be got to run as smoothly (not by multiplying the cylinders) as a steam engine, then it might be possible to use ball bearings satisfactorily, but not while the impulse remains as a violent shock on piston, as all explosions must be. Ball bearings are being used too freely at present by men who do not understand their actions and limits of successful application. Ball bearings are decided upon in a certain vehicle. Good! The makers' list of ball bearings is taken, and a bearing or bearings to take the load chosen ordered and fitted. Then the trouble starts, and the poor repairer has to take the blame of an idiotic designer, who ought to be dosed with the balls for pills. One make of car that I get a good number of to repair has ball cups and races forced into aluminum castings. When these are worn, it is almost impossible to get them out, grinding through the race with a small high-speed emery wheel being about the only way. This means a new race, balls, a lot of work, and a big bill. In cars built a few years ago, the chassis hardly ever gave trouble. In modern cars of many makers, not only has the machinery to be looked to, but new balls, races and bearings have to be fitted to hubs of wheels, axle bearings, bevel pinion shaft, etc. A favorite type of bearing now is the cage type, containing a single row of balls. Go to Olympia show and I will wager that you will find a great number of cars there with these fitted to the front wheel spindles. There are generally two of these bearings in each hub. Now, the steering wheels are inclined outwards, as they should be, which means that a big thrust is thrown on the under side of these bearings continuously, and I believe that not in a single instance is a thrust bearing fitted. The race is cut away on under side, and steering quickly gets sloppy, and no adjustment is possible. I have many modern cars that in six months' running have more slop in front wheels than in many old Panhards, Daimlers, etc., that have been running six years, and the slop on these is adjustable even then. Ball bearings are capable of doing the work, and the fault does not lie with this type of bearing, but the way that they are used. Here, again, I take the opportunity of stating that no man should inflict the design of a car on the public until he has served a year or two in a repair shop where all makes of cars are repaired. Here is a last instance of how balls are used. Rear axle of "Ruinem" car, live; wheels running on tubes driven by dogs from shaft. Plain ball ring bearings, two in each hub. No thrust bearing. Near side rear wheel worked in until internal hand brake shoes cut through supporting flange of drum, when brakes were on descending steep hill. Car swerved into ditch, nearly killing occupants, and ruining car. Age of car, nine months.

HOW THE AUTOMOBILE IS WINNING THE BOUNDLESS WEST

A WAY out in the edge of Colorado is one real estate firm that uses six touring cars daily showing land to customers, and this has become a common thing for the real estate dealers of the West, so much more ground can they cover in this way, says the December *World To-day*. In the Panhandle of Texas, to which excursions are being run every month, every firm uses cars. In one place a firm has the sale of ranch lands twenty-two miles from the railway station. To get a good track it plowed a sixteen-inch furrow as straight as could be drawn, turning over the sod and leaving a smooth, hard surface. Then a car was run over this route, with one wheel in the furrow and the other whitened with flour, leaving a mark on the sod. Another furrow was turned, and now there is a straightaway course of twenty-two miles with two smooth, hard tracks, and the cars with seven passengers make the trip in forty-five minutes several times a day.

No one in the Western town gets so much practical good out of a car as the physicians. Distances are magnificent on the plains, and while settlement has advanced, the towns are far apart, compared with the East. The county-seat doctors have a clientage that reaches out twenty miles in every direction, and with teams and buggies they find it almost impossible to cover it. With a runabout they make their seventy-five to one hundred miles a day, and are satisfied. Those who do not own cars pay more than the cost of maintenance in hiring them from liverymen. The automobile has done more for the physician's practice than anything the West has ever discovered.

The editor of a country paper in the West wrote four columns describing "Our New Auto," after he had purchased a machine. It was not necessary. Out of his two thousand subscribers probably one-tenth knew more about motor cars than he did himself; one-twentieth owned cars, and as many more will by next spring. Twenty-two cars were photographed on the streets of a prairie town one day last summer, and ten more owned in town were absent. Trips to the mill with a few odd sacks of wheat, or to market with the fresh vegetables are ways in which the Western farmers are utilizing their cars. It is becoming a possession as common in the Western country town as it is in the Eastern city.

The problem of the car in the country town is entirely different from that of the city owner. Wages are not so high and the conditions inspire a greater self-reliance on the part of autoists. Take a specific instance of a town two hundred miles west of the Missouri river in central Kansas. It is a typical prairie city of less than five thousand persons. The automobile was intro-

duced at first by several poor second-hand machines, and only two years ago did the first standard machine make its appearance. Now there are twenty cars, one-fourth of them touring cars, the remainder runabouts. Others are being added every month. Many farmers are buying, several mail carriers have runabouts with which to cover their rural routes, and a livery with automobiles for hire does a good business.

Western roads, in the prairie States especially, are very fine eight months of the year. They are free from stones generally, and hills are moderate, all tending to encourage the motorist. It is because of these conditions that it is becoming possible for the man with moderate means to own a car. There is so little amusement in the plains region—the mountains and the lakes are nearly a thousand miles away—and motoring opens up a wide new field for pleasure. When one may drive thirty to fifty miles in an evening over dirt roads that are as smooth as asphalt, with prairie breezes blowing health and rest into one's cheeks, it is worth while. On such roads tire troubles are reduced to a minimum. My first two thousand miles with a four-cylinder car were without a puncture, and with no injury except a sand blister on one tire. Tire records of four thousand to six thousand miles are common, and there is much satisfaction in the promise of long life for the most sensitive portions of the equipment.

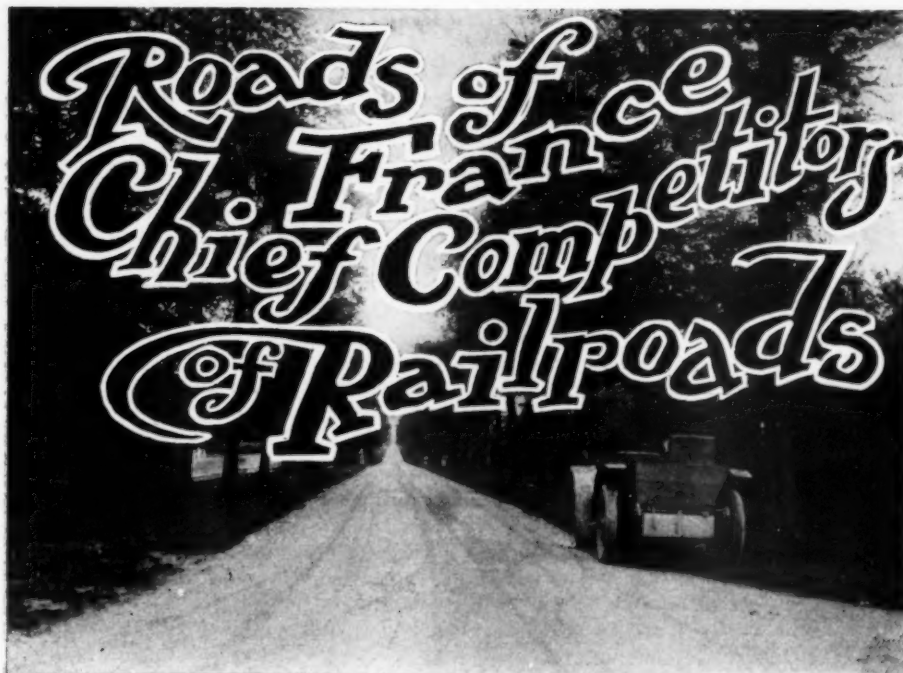
AN IMPROVED COLLAPSIBLE AUTO PAIL.

Automobilists having traveled any distance with a leaky radiator which had to be filled with the ordinary type of collapsible canvas pail have generally arrived home with stronger feeling against the latter article than against their cooling apparatus. Though it is easy to bring the water to the radiator it is not such an easy matter to put the liquid where it is wanted. An improved type which has recently been put on the market overcomes these difficulties by making the pail funnel shaped and fitting the base of it with a metal tube ordinarily closed by a simple valve. The pail, the simplicity of which is apparent by the illustration, is made of rubber cloth, bound by a circle at the top, to which is attached a handle, the valve being operated by means of a chain fastened to the handle.

Cheap taxicab service was established in London on New Year's Day. Twelve cents a mile, or 12 minutes, and 6 cents the half-mile, or 6 minutes, is the new rate.



HOW TWO REO CARS WERE UTILIZED BY E. C. SPERRY AND PARTY FOR A DAY'S DUCK HUNTING AT RATON, NEW MEXICO.



ONE OF THE STRAIGHT, BROAD HIGHWAYS THAT MAKE FRANCE ENVIED AMONG NATIONS.

THE present road system of France was started by the first Napoleon. No new roads of importance have been opened in some years, but the work of the engineers in the Department of Public Works of France is confined to keeping the roads in a state of high efficiency. France, to its remote and inaccessible sections, is so traversed with excellent roadways that there is now no necessity of adding many more lines of communication. The highways are the chief competitors of the railroads. The far reaching and splendidly maintained road system has distinctly favored the small landed proprietors and in their prosperity and their ensuing distribution of wealth lies the key to the secret of the wonderful financial vitality and solid prosperity

highways, their national system consists of 23,656 miles of national routes, which cost the nation \$303,975,000 to build. The national routes traverse the entire nation and connect the important centers, and are now paralleled by railroads. They have also department routes connecting the important centers of a single department, also their more local roads. The national roads, 23,656 miles, are in charge of a single-headed department, with one man responsible for their maintenance and good condition.

Public opinion requires that the local highways be kept in a sufficiently good condition to permit of a good draft horse hauling a load of 3,306 pounds eighteen and a half miles per day.

of the French nation. The road system of France has been of far greater value to the country as the means of raising the value of lands, and of putting the small peasant proprietors in easy communication with their markets, than have the railways.

The United States is constantly drawing information from other countries through its Consuls, and from Consul-General R. P. Skinner of Marseilles comes a recent report of the French roadway system. He says the French roads are generally recognized as the best and most complete road system in the world. The roads of France are good, not because of any superiority of raw materials, not because of any special talent for road building, but because of the constant, intelligent supervision of the department having charge of the roads and its efficient administration.

France has 316,898 miles of local highways built at a total cost of \$308,800,000, of which the State furnished \$81,000,000 and the interested localities \$227,740,000. In addition to these local

PRIZE GIVING FOR ROADS MAINTENANCE.

ONOMOWOC, Wis., Dec. 30.—There is now a plan on foot to offer a number of handsome prizes for good roads building, commencing early next year, the object being to greatly improve and to maintain one of the most important runs in the State. Back of the movement is the Milwaukee Automobile Club. The project is to divide the highway into several districts and to offer cash prizes for the best kept sections. The prizes will be offered to the several property owners or farmers through whose premises the highway runs. The highest prize will be \$250, and they will run down to a sum that will be large enough to stir up interest alone.

This section of the State is the most famous in all Badgerdom in the matter of unique schemes to improve and keep up the roads. At one time the wealthy summer home owners offered school children cash prizes for throwing stones off the road while they were trudging back and forth in attending schools in country districts. Pathmasters were appointed, they watched the work, and on their reports the prizes were awarded.

It might be mentioned in this connection that not long since the women's clubs of Kane county, Ill., raised over \$1,000 to improve and beautify a road along the Fox river. The money was raised by selling a silver spoon, engraved in the bowl of which was the head of a famous Indian chief who used to trail over the road in pioneer times and always was noted for his kindly treatment of the palefaces. The spoons have been sold to people living in half the States of the Union.

INDIANA SPENT \$7,000,000 FOR ROADS IN 1907.

INDIANAPOLIS, IND., Dec. 30.—Indiana has spent almost \$7,000,000 for new roads during 1907, and the most of this amount since April. This is greatly in excess of the amount spent for similar purposes in any previous year and is due largely to the law passed by the Indiana Legislature last spring authorizing roads not more than three miles long, when petitioned for by fifty taxpayers of a county, providing it connected two roads traveled by rural mail carriers.

The resources for road making consisting of rich gravel and limestone deposits in almost all parts of the State, together with the coming of the bicycle, the automobile and the rural route carrier, has done more than anything else for roadmaking. Some counties have built from sixty to one hundred miles of new gravel or stone roads during the present year and figures will soon be issued by the State on the subject.

It is estimated that more than 35 per cent. of Indiana roads are now improved, probably a greater average than any other Western or Middle West State can boast. Although the new road law has not been greatly in favor with public officials, there has been no determined effort so far to test it. In Madison county, where the greatest objection is raised to it, a number of new contracts have recently been let.

Indiana possesses some of the best established automobile manufacturing concerns in the entire country, and the increasing number of autos undoubtedly has had a vast influence upon the great progress in roads building in the year just closing.



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Importers Make Bold and Most Artistic Front.

Even those who are surcharged with American automobile patriotism must admit that the Importers have made a brave attempt this week in Madison Square Garden to challenge the general belief that the day of the European car in this country is waning and approaching the last quarter of the moon. The display, mechanically and artistically, is well worth seeing and studying, and, of course, there will be some buying—in fact, for years to come there will continue a paying demand for several foreign makes which seem to have established a popularity deserved and conscientiously sought. But it is a prediction based on the present situation and future indications to prophesy that in the forthcoming twelve-month the Importers will abandon this market—practically confined to the Atlantic seaboard—until less than a half dozen will pretend to American representation.

This situation was inevitable from the beginning, but the reaching of it may have come much sooner than was anticipated by those dealing in foreign cars. Of these concerns the most discerning have grabbed time by the forelock and secured an additional agency for a home product. Dollar for dollar, the American car now easily holds its own against the foreigner, and there are other facts which seem in the opinion of many to give it advantages over its rival. But the Importers have made a notable stand in Madison Square Garden, and the exhibition should be well attended, both by the enthusiasts and the men who make and sell American automobiles.

What Has Been Attained with Free Alcohol.

Much surprise seems to have come to certain observers of the fuel situation that immediately upon the passage of free alcohol legislation in this country a tremendous industry did not spring up and the price of the commodity fall to a purely nominal figure. The numerous predictions made for the measure by its supporters are dragged forth and duly reviewed, and the practical effect of each wholly discounted. In other words, the misguided ones would have it understood that great have been the promises, but exceeding small the practical results. Though such is far from being the actual case, let it be granted for the sake of argument and see what the situation holds. Before the passage of the bill in question grain alcohol cost \$2 or more, and wood alcohol \$1 a gallon, at retail, the latter not being suitable as a motor fuel at any price. Now denatured grain alcohol sells at 45 cents a gallon, despite the fact that corn has seldom been higher, and this is the American basis of alcohol.

So much for what has been accomplished in the space of a single twelve-month toward lowering the price within approach of an attainable minimum. Where its use as a fuel is concerned, it was no more to be expected that this would meet with any immediate widespread adoption than that millions of capital would at once be invested in its manufacture. Experiments have proved conclusively that alcohol is available as a fuel for the internal combustion motor as at present constituted, and that specially designed motors will mean increased economy. Where gasoline is high this is already the case, as witness the experience of the Paris municipal buses. Those who feel that free alcohol holds but little promise should reflect that great things are not accomplished in a year; it took not a few years to successfully introduce the use of kerosene oil, and to imagine that alcohol must be put down as a failure merely because it has not performed wonders the first year, is little short of absurd.



The Great Value of Uniform Auto Legislation.

At a time when the legislative mills are about to take up the task of grinding out a new crop of automobile legislation, it is opportune to call attention to one or two salient points in the legal situation, which every autoist who has his own interests and that of his confrères at heart should bear in mind. The situation, as it stands at present, is one of confusion. Before leaving the borders of his own State, or undertaking a tour that shall take him over several boundaries, the autoist must go prepared with all sorts of information and spare licenses, which, in the aggregate, entail no small outlay. In some States, such as New Jersey, unless he go thoroughly prepared, he will be subjected to annoyance beside which the difficulty of getting into or out of some petty principality on the Continent without the necessary credentials is mere play.

The most immediate remedy is that of uniform State laws, and every autoist in the country should do his best to second the able efforts of the American Automobile Association in this direction. A sensible and reasonable measure that meets all requirements has been drafted by its legislative board, and the Association has pledged itself, among its other activities, to procure its passage in as many States as possible during the coming sessions. Several State associations have already undertaken the good work with fair prospects of success.

Of course, the Federal registration bill of the A. A. A. introduced at Washington refers solely to registration, and when passed will establish a plan whereby home registrations will permit an autoist to go anywhere in the country. These, indeed, are two objects well worth working for, as with the vastly augmented touring radius of the modern automobile there are few autoists who do not have occasion to go outside their own State limits several times a year. Now that a concerted effort has been set afoot looking to their realization, it behooves every autoist to do his utmost to make it successful from the start.

OVER FIFTY STARTERS EXPECTED FOR THE GRAND PRIX

PARIS, Dec. 23.—Fifty-five to sixty is estimated to be the number of cars which will line up for the start in the French Grand Prix, to be held under international rules, during the first fortnight of July. Entries only opened a few days ago, and will not close until 6 p.m. on February 15, but sufficient is known of the intentions of all the important constructors of automobiles to prophesy with certainty a larger entry than for any event in France since Paris-Madrid.

Excluding America, whose participation is very doubtful, five nations will take part in the great speed test. France will supply full teams from Renault, with Sisz, Caillois and Dimitri as drivers; Panhard, to be handled by Heath, probably Teste, and a third not yet chosen; Brasier has definitely made up his team with Théry, Baras, and Bablot; Bayard-Clément, though not having signed any contracts, will certainly have Garcet as leader, and probably Rigal and Leblon; Dietrich, as in previous years, will have the same trio, Duray, Rougier, and Gabriel; Motobloc has only chosen two drivers, Pierron and Courtade, the third to be appointed in January; C. G. V. will have either one or two cars at the starting line, but nothing is known as to their drivers; Breguet has promised two six-cylinders, but as the exact regulation for this type of engine has not yet been made known, no steps have been taken; Mors is not absolutely certain to start, though should they do so, Gasté and Landon will be two of the drivers. Hotchkiss will not race; Gobron and Porthos are doubtful. If rumor can be relied upon, Westinghouse will participate in a race for the first time. For France, this would give 22 certain starters and 9 doubtful.

Italy will have four full teams. Fiat drivers will be Nazarro, Lancia, and Wagner. Itala will be handled by Cagno, Fabry, and probably Henry Fournier. Isotta-Fraschini is expected

to have as drivers Minoia, Trucco, and Tamagni. S. P. A. is said to be busy on three cars, but has not chosen drivers.

Belgium has already entered three Germain cars, to be driven by Degrais, Roch-Brault, and Perpere. Pipe has at present only selected Hautvast, but two other drivers are being looked for. Minerva refuses to make an official announcement, but probabilities are that three cars will be entered.

From Germany, Mercedes, Benz, and Opel are certain starters, Mercedes to have as drivers Willy Poegge, Salzer, and Baron de Caters, or Burton. Hemery, Hanriot, and Erle will handle the Benz cars. Fritz Opel and Jaerens will drive for Opel.

From England Ariel is the only certain starter, one car from this factory being finished, and will probably be joined by a second. Crossly and Simplex are spoken of as intending to race, and the same is said of Napier, but this latter firm may be set aside as a non-starter.

On a moderate estimate this would give 53 starters, made up of 22 French, 12 Italian, 9 Belgian, 8 German, 2 English.

According to the information to be picked up around the factories, it would appear that all the contestants in the 1908 Grand Prix will have the maximum bore of 155 millimeters and stroke from 170 to 175 millimeters. At the Panhard factory three engines have been built and tested out on the bench, the cylinder dimensions of each being 155 by 175 bore and stroke. Before going on the cars they will be put into motor boats and tested at Monaco. Shaft drive will be adopted on this year's Panhard racers, and there will be four speeds and reverse, with ignition by high-tension magneto.

Bayard-Clément has built three distinct models with cylinder dimensions respectively of 155 by 160, 155 by 175, and 155 by 185 bore and stroke, all being well advanced except the last. The probability is that the 155 by 175 engine will be adopted.

A. A. A. RACING BOARD ISSUES SANCTIONS AND ADOPTS RULES

SANCTIONS for three important contests were decided upon by the executive committee of the A. A. A. Racing Board, at a session held at 437 Fifth Avenue, New York City, Saturday morning, December 28. At the session were Vice-chairman Frank G. Webb, who presided in the absence of Chairman Thompson; Dave H. Morris, A. R. Pardington, E. Lincoln Lippitt, A. G. Batchelder, A. L. Riker, and Secretary F. H. Elliott. President William H. Hotchkiss was also present.

The sanctions granted were as follows:

Automobile Club of America, Ormond-Daytona, Fla., March 2-7.
Savannah Automobile Club, Savannah, Ga., week beginning March 15.

Robert L. Morrell, Chairman, Briarcliff Trophy Race, Westchester County, N. Y., April 24.

It being the sense of the meeting that in future sanctions the use of international and national should be granted only with the consent of the Board, on motion of Mr. Morris, seconded by Mr. Lippitt, the following was adopted to be incorporated in the racing rules:

An international race is a race where the entrants are respectively named by and represented by two or more of the recognized national affiliated automobile clubs of the world.

A national race is a race where the entrants are respectively named by and represent any two or more of the automobile clubs affiliated with the American Automobile Association.

It was stated that the compilation of the 1908 racing rules was practically completed and same will be announced in printed form early in the new year.

CHAIRMAN OF CUP COMMISSION MARRIES.

Jefferson deMont Thompson, chairman of the A. A. A. Racing Board and of the Vanderbilt Cup Commission, and Mrs. John E. Dunlap-Bradshaw, daughter of the late Robert Dunlap, were married Saturday noon, December 28, at the home of the bride's mother, Mrs. Robert Dunlap, 111 West Seventy-second street, New York City. The Rev. Dr. Allen McCreedy, of the Rutgers Presbyterian Church, performed the ceremony. The bride's uncle, H. K. Burras, gave her away. Mrs. J. Lawson Johnson, of London, the bride's sister, was matron of honor. The maid of honor was Miss Marion Baker. P. S. Thompson was his brother's best man.

S. A. E. MEETING AT THE NEW GRAND.

Friday afternoon and evening, January 3, there will be held at the New Grand Hotel, Broadway and Thirty-first street, New York, the third annual meeting of the Society of Automobile Engineers. The afternoon session will be devoted to the election of officers and the reading of papers on various subjects of interest. This will be followed by a dinner in the evening and the reading of the remaining papers prepared for the occasion. Among the subjects to be discussed are the following: Automobile Hub Ball Bearings, by Henry Hess; Nature Hard Gears, by Thomas J. Fay, and Some Notes on Self-aligning Taper Roller Bearings, by H. W. Alden.

JERSEYMAN'S ECONOMICAL FIGURES FOR 6,000 MILES

Editor THE AUTOMOBILE:

A few days ago I read in THE AUTOMOBILE of a detailed statement of the items of the cost of upkeep of a 20 horsepower car. I send the following account of my expenses:

My car is a 24-horsepower, four-cylinder, four-cycle, air-cooled car, with the cylinders in a "V." It weighs, without the top, empty, over 2,200 pounds. It has storage battery and dry cells in reserve. It cost, without top, \$2,500 f. o. b. factory.

This car, between May 28, 1907 (date of purchase) and the end of November, 1907, was driven 6,006 miles by me. Of this mileage about 1,000 miles was on a trip through New England and the rest was made in New York and New Jersey and vicinity. While a large part of this was on macadam, much driving was done in out-of-the-way country districts on dirt roads.

I have kept two separate books for this car. In one book I enter each day (that I drive) the odometer reading on starting and on my return, and the amount of gasoline put into the tank. I also enter therein the amount of oil, grease, etc., put in and date of same, also the date when anything is done, such as taking off and greasing wheels, putting on or taking off tires, charging battery, etc. In the other book I enter every item and its cost, and the date when the amount was paid. In that way many of the items in the first book appear also in the second book, which, of course, contains all items of whatsoever nature they may be.

	Cost in cents, per car mile.
Tires: Casings.....	\$101.05 1.682
Inner tube.....	9.40 0.156
Repairs to casings and tubes.....	18.55 0.308
Anti-skid devices.....
Power: Gasoline, 531 gals.....	94.45 1.572
Cyl. oil, 15 1-2 gals.....	11.90 0.198
Grease and gear case oil.....	3.30 0.054
Ignition: Charging storage battery.....	3.95 0.065
Dry batteries.....	3.30 0.054
Spark plugs.....
Repairs: Miscellaneous.....
Ordinary.....
Due to accidents.....	3.90 0.064
Lights: Carbide and kerosene.....	2.12 0.035
Garage clothing.....	1.00 0.016
Labor.....	11.05 0.182
Making adjustments.....	4.90 0.081
Spare parts taken on trip but never used....	3.05 0.052
Sundries.....	20.16 0.335
Replacing lost and damaged tools.....
	\$292.08
Storage and cleaning.....	51.25 0.856
	\$343.33 5.716

In order to have a clear understanding of the above it will be necessary for me to make the following statements: (1) Under the item "labor" is understood work such as the follow-

ing: Taking off wheels and greasing their bearings, taking off tires, sandpapering and shellacking rims, replacing tires, washing and cleaning outside of engine and sub-frame, etc.; but no repairs of any kind were charged up under this head. (2) Under "adjustments" were charged once taking up wear in connecting rods and adjustment of level of carbureter. (3) The repairs due to accidents were: Straightening steering rod on account of running into a dog, and repairing a lamp damaged by a carriage being backed into it.

To make a fair comparison between the cost of maintenance of my car and the one mentioned in the issue of December 12 I shall have to say: That I only had to pay for storage (which included washing and cleaning the car) during the months of June and July, and on the two weeks' New England trip; the rest of the time I was able to store my car rent free in the garage of a relation. In order, therefore, to make the comparison a fair one, I shall add to the item of \$51.25 for storage and cleaning the sum of \$120, or a total of \$171.25, although I actually paid only \$51.25. That is to say, I assume that this year I paid for nine months of live storage (including cleaning) at \$15 and three months of dead storage at \$5, because I have not the time to use my car during the winter and consequently lay it up during that season. On this basis my expenses would amount to \$463.33, or \$0.07714 per car mile, for a mileage of 6,006 miles.

Five hundred and thirty-one gallons of gasoline for 6,006 miles gives an average of 11.10 miles to the gallon; 15 1-2 gallons of cylinder oil gives an average of 387.09 miles to the gallon.

Of the four tires originally on my car, one went 4,940, one 5,072, one 5,200, and the fourth 5,800 miles.

My valves were not ground until after the car had gone over 5,000 miles, and then they were not at all in bad condition. My spark plugs did not have to be cleaned until after I had gone over 5,300 miles, and I have the same plugs in the engine today that came with the car when I bought it.

I seldom carried less than four in my car, and often carried five. It is safe, therefore, to place my average number of passengers at three; three and a half would be nearer. On the basis of what I actually paid, therefore, it cost me 1.905 cents per person per mile, leaving out of consideration the first cost of the car. In the second case, where I assume that I paid \$463.33, I should have paid 2.571 cents per person per mile.

My car is in excellent condition in every respect, and, so far as my knowledge extends, I do not know of any car of its weight and power which has been run so economically and with such remarkable freedom from trouble of any kind, except some of the same make in this vicinity with whose owners I am acquainted.

The top, speedometer, insurance, vulcanizer, registry of car, 1907 license, and car number cost \$247.10.

EAST ORANGE, N. J.

J. G. C.

WHERE THE AUTOMOBILE REPLACED THE RAILROAD

WESTBURY, Long Island, N. Y., Dec. 30.—According to the New York Times correspondent more than two hundred large automobiles brought week-end parties to nearly all the large country places of Nassau County, as well as a number in Suffolk County, where the Christmas festivities will continue until after the new year is ushered in.

All the Long Island macadam roads were in fine shape for automobiling, and the colony entirely dispensed with railroads and went to the various country places in large motors. At

Hempstead, Cedarhurst, Woodmere, Great Neck, Garden City, Wheatley Hills, and the Piping Rock and Nassau Country Clubs there was not a large place but had its full quota of visitors.

Though there has been but little wintry weather thus far this season, Long Island roads do not suffer to any appreciable extent from heavy snows, so that cars are in constant use between country places and the city throughout the winter. This applies more particularly to the western end, or macadamized sections. The Jericho turnpike is now improved as far as the county line.

THAT NEW YORK CITY ORDINANCE CONCERNING USE OF CHAINS

THROUGH the activity of Chairman Charles T. Terry, of the A. A. A. Legislative Board, representatives of city, state, and national automobile organizations protested to the Park Board of Greater New York at a hearing, held Thursday, December 26, against the recently enacted ordinance which forbids the use of chains on wheels of vehicles entering the park or driving on park thoroughfares anywhere in Greater New York. Believing that the acceptance of such an ordinance without a protest and test of its legality might bring about general adoption of similar measures in cities throughout the entire country, Chairman Terry called the automobilists together. A conference at A. A. A. headquarters, No. 437 Fifth avenue, preceded the hearing at the Arsenal in Central Park.

W. W. Niles and A. R. Shattuck represented the Automobile Club of America; Russell A. Field appeared for the Long Island Automobile Club; Melvin Bender spoke for the New York State Automobile Association, and, of course, Chairman Terry represented the national organization. Alexander Schwalbach appeared for the Good Roads Association of Brooklyn. The three Park Commissioners of Greater New York were all present, with Mr. Smith of Manhattan Borough presiding.

Before the protestants began, Commissioner Smith advised that the legal aspect of the matter was not to be discussed, as the ordinance had been framed by the Corporation Counsel. Mr. Bender, of the State Association, was the first speaker. He said that it was absurd to restrict any more than necessary the traffic of automobiles in the parks, which were primarily designed for pleasure purposes. The driveways were limited altogether to pleasure vehicles, and automobiles constituted today a large part of such vehicles.

Chains, he declared, were necessary in metropolitan districts, where the lives of pedestrians were imperiled if a machine were unable to come to a quick stop. The chains prevented skidding, that was otherwise inevitable in muddy or cold weather. If the park authorities forced them to comply with the regulations they must stand responsible for the consequences, he said.

He added that even New Jersey, regarded as the mother of automobile persecution, had no measures so drastic as the recent park ordinance. The use of chains on motor vehicles is prohibited on the parkways, but is allowed when the weather conditions make it dangerous both to the occupants of the automobile and those who use the driveways. Even the steel caulks on the horses' hoofs were more injurious to the roads than the smooth link chains which were universally used on tires.

In conclusion he questioned the authority of the board to make such a mandatory regulation. By the city charter they were empowered to regulate traffic, but that did not give them the power to restrict pleasure vehicles, he said.

Hiram Percy Maxim, of the Mechanical Branch of the Asso-

ciation of Licensed Automobile Manufacturers, next discussed the ordinance and gave his opinion of the injury that a road suffered by the use of chains on automobile wheels. He said that it was the only expedient that ten years of study of the problem brought forth. He told of his investigations made on an endurance run when he examined a macadamized road after a hundred machines had passed over it, every one of the automobiles bearing the chains. The road, he said, had sustained no damage. The soft bed of the road after stormy weather and the pneumatic cushion of the tire, according to his view, absorbs the chains, without inflicting any appreciable injury to the road.

Mr. Terry argued that the present roads were inadequate for modern traffic. In the evolution of locomotion, the roads have failed to keep pace. They are the same now as they were long before the discovery of the automobile. A new surface should be applied to the driveways, so that they would be able to sustain the strain of automobile traffic. The bad effect of the New York ordinance would travel to other cities, which patterned their regulations after the metropolis, he declared.

The popular impression that automobilists are superior to the law, declared Mr. Niles, had gained considerable ground, but it was entirely erroneous. They were more amenable to reasonable legislation than any other class of people, but in this instance he thought that their good nature had been violated. The enforcement of the new ordinance in the Bronx would be greatly felt, as the only roads worth traveling over in a motor car are those under the direction of the Park Department. To compel automobiles to go without chains on wheels would drive them to the other thoroughfares which were in bad condition.

For the preservation of the roads Mr. Shattuck suggested an emulsion composed of water, soft soap and oil. This formula is now being used with much success in Boston. Commissioner Smith said that the department had experimented with the emulsion, but the cold weather had forced postponement until another season of the year.

Mr. Field confirmed what the others had stated and added other convincing facts.

P. W. Strong was the final protestant, who asserted that smooth tires without chains did more damage to the roads than the chain-bearing wheels.

At the conclusion of the hearing, the Automobile Club of America offered to have tests to show the Board the effects of the tires upon the roads in various weather conditions. Commissioner Smith appreciated the offer and said the club would be called upon if the Board considered it advisable to have such tests.

Future developments will be awaited with much interest, for the automobilists do not intend to accept the ordinance without a further protest and possibly legal action.

BUT THE AMENDMENT WAS VOTED DOWN.

PHILADELPHIA, Dec. 30.—Although in the present conditions of affairs in Philadelphia, the "gang" has things pretty much its own way, the reformers still have a few watchdogs in councils who keep tab on their confrères. The other day when an ordinance was introduced calling for an appropriation of \$5,000 for the purchase of an automobile for the use of the chief of the highway bureau, Councilman Lambirth created not a little consternation by proposing an amendment providing that the car should bear on both sides the words "The Department of Public Works." Such a proposition, it was objected, was insulting, and the amendment was accordingly voted down.

TENDENCY FOR BUYING BECOMING APPARENT.

CLEVELAND, O., Dec. 30.—At this season of the year the demand for automobiles for immediate delivery is not as strong as in the Spring, the demand in most cases being for limousines and landaulets. During the past two weeks orders have been coming in rapidly to the offices of the Peerless Motor Car Company, which shows the tendency for heavier buying after the first of the year. The Peerless Company has kept a sufficient corps of men at work every day to supply the demand for their cars and within the past week have increased this force.

The new buildings commenced early in the fall are now ready for occupancy and the drafting room and office are in use.

NEW YEAR FULL OF PROMISE FOR THE CLUBS

HARRISBURG TO PHILADELPHIA, AND RETURN.

HARRISBURG, PA., Dec. 30.—The Motor Club of Harrisburg will hold its second annual endurance run May 4 and 5, and active steps are already under way for the big event. The contest committee has decided to make the 1908 tour to Philadelphia and return, with an increased mileage each day over last season's hard test. The route for the first day will lead through Lebanon, Reading, Kutztown, Allentown, and then on to Philadelphia, where the night control will be established. This course will be almost 150 miles. On the return trip the route will lead through Norristown, Pottstown, Reading, Lancaster, and to Harrisburg, a mileage of about 130 miles.

The rules which the committee are now considering will be much stricter than those for the initial contest. All bonnets and tool boxes will be sealed, and cars and engines will be required to be kept running at all times except when the rules of the roads or punctures require a stop. Penalties will be given for all gasoline, oil, and water taken on after the official start of each day, and after the run a technical committee will examine all cars for any material breaks or defects.

The rules and penalties will be made clear to all contestants through a table which will show the penalties in points which can be registered against any car. There will be four classes, viz.: Touring cars costing \$2,500 or over; touring cars costing less than \$2,500; runabouts costing \$2,000 or over, and runabouts costing less than \$2,000. In addition to the four trophies for the 1908 run the four touring cars which were tied for the 1907 trophy will contest for its permanent ownership. These cars are the White of W. C. White, the Pullman of E. G. Irvin, the Thomas of S. K. Hamburger, and the Pierce Arrow of H. F. Rawll.

YORK (PA.) CLUB WANTS SOME RACING.

YORK, PA., Dec. 30.—Enthusied by the success of other racing meets held recently in this part of the Keystone State, members of the York Automobile Association are contemplating the holding of several big meets here next season. Officials of the York Motor Car Company, including H. R. Averill, sales manager, have announced that they are ready and willing to foster the auto racing sport here and it has been suggested that a mile track be placed in condition at the grounds of the York County Agricultural Society. The present half-mile track at the fair grounds is one of the best in the State for horse racing, and it is overlapped by a mile track. This is used at present for training purposes. Local auto enthusiasts are of the opinion that it would take little expense to place the mile track in good shape, including the banking and fencing of it. The plans of the Yorkers are that at least three race meets be held here each season. Mile tracks in this part of the country are more than a luxury and the York autoists propose to start the innovation in the early Spring.

BAY STATERS HAVE A NEW YEAR'S TREE.

BOSTON, Dec. 31.—The annual meeting of the Bay State Automobile Association for the election of officers and the transaction of other business will be held at the clubhouse on Monday, January 6.

To-night, in accordance with a long-standing custom, the annual Christmas tree and New Year's celebration was held. The Christmas tree was arranged by the house committee and provided a large amount of amusement for the many members who were present. The gifts were selected with care by the committee and nobody present failed to receive a remembrance.

MASSACHUSETTS MIGHT SUPPLY A CUP COURSE.

WORCESTER, MASS., Dec. 30.—The Worcester Automobile Club as usual will aid and abet the Massachusetts State Automobile Association in its legislative and other work this season financially and otherwise. At a meeting of the Board of Governors, Saturday night, it was voted that the club appropriate \$300 for the State association over and above the regular dues which are paid, in order to assist the State officers in the work of looking after the interests of the autoists of the State at the State house this winter.

In common with the rest of the clubs, Worcester club is insistent in its support of the "light bill" calling for lights on all classes of vehicles using the public highways at night, and the bill which was introduced last year giving to mayors and aldermen of cities and selectmen of towns the right to set apart sections of highways for automobile events the same as they can do now for horse, bicycle, and foot races, will be pushed again this year.

A smoker at which aeronautics will be the chief topic is planned for the club the latter part of January and a dance in the club hall is another event which is due about January 14.

Through tourists on the New York-Boston route between Worcester and Springfield will find the highway a hard one. George Stowe made the more than 100 miles to Springfield and back yesterday in his White steamer. "There's everything there to make bad riding," he said afterward. Mud, ruts, snow and ice are in the combination.

BUFFALO'S CLUB PROSPEROUS AND HUSTLING.

BUFFALO, N. Y., Dec. 30.—According to the annual report of the treasurer at the recent annual meeting of the Automobile Club of Buffalo, that organization has \$3,357 in its treasury, \$2,500 of which has been deposited in the American Savings Bank as the nucleus of a country clubhouse fund. The present membership is rapidly approaching the 1,200 mark, and the newly elected president, Frank B. Hower, intends, with the co-operation of Secretary Dai H. Lewis, to make it the largest automobile club in the country before 1908 is concluded.

President William H. Hotchkiss, of the American Automobile Association, is the father of the local club, and in the course of his remarks at the annual meeting, which was attended by over 350 members, he complimented the club upon the size and character of the assemblage and said there was not another club in the United States which could gather so many members together on such an occasion. He exhorted the members to keep up the present spirit and to maintain a big and enthusiastic working club, democratic in character, where owner, driver, mechanic, agent and maker could meet and work for the general benefit.

The retiring president, Seymour P. White, was presented a silver loving cup, E. H. Butler, proprietor of the Buffalo *News*, being the spokesman. Charles Clifton and E. R. Thomas are on the club's board of governors, on which Mr. Butler also serves.

A. C. OF TOLEDO ORGANIZES AND ELECTS.

TOLEDO, O., Dec. 30.—The Automobile Club of Toledo is now organized and an applicant for membership in the Ohio State Automobile Association. The club starts with 125 charter members, and these officers were selected for the ensuing year: President, E. D. Libbey; vice-president, E. J. Marshall; treasurer, J. M. Steenberg; secretary, George S. Mills. The board of governors chosen consists of the above officers and the following: Marshall Sheppey, W. W. Morrison, John Mockett, J. J. Manning and F. M. Brigham.

BOSTON TRADE CHANGES FOR THE NEW YEAR

BOSTON, Jan. 1.—The New Year brought with it a number of changes in the local automobile trade and, though there are still some agencies of well-known cars to be placed, the trade in general is pretty well settled down for the coming season's business. One of the most interesting announcements comes from the Studebaker Automobile Company, of South Bend, whose product of gasoline and electric pleasure and commercial vehicles has been represented here for a number of years by agents. Early in the New Year this company will discontinue its agency and will open a branch house in the newer automobile section on Boylston street. The company also proposes to construct a fireproof garage with complete accommodations for gasoline and electric vehicles and with a fully equipped repair shop and a complete line of parts for all its models. W. R. Daniels, treasurer of the Prentiss Motor Car & Supply Company, which has represented the Studebaker line in Boston, will become manager of the branch.

The removal of the Studebaker agency from Berkeley street near Tremont about closes out that automobile section, which once was the home of such well-known cars as the White, Buick, Locomobile, Aerocar, American Mors, and others. Nearly

all these cars are now sold in the newer section in the vicinity of Boylston street and Massachusetts avenue.

Another interesting New Year's change is the opening of the new Thomas agency, also in upper Boylston street. The agency for the Thomas is in the hands of the Whitten-Gilmore Company, composed of Charles Whitten, long and favorably known as an automobile dealer in Lynn, and E. A. Gilmore, recently connected with the White Company in New York and previous to that manager of the Rambler New England branch in Boston. The company's new store, which has been remodeled for it from an apartment house, is next to the salesrooms of the J. W. Bowman Company, agents for the Stevens-Duryea.

Still another newcomer on Boylston street is the branch of the Panhard & Levassor American agency. George T. Gould comes from New York as the manager of the branch and the company is preparing to make a greater effort than ever before to secure a larger share of the Boston business for foreign machines. H. C. Stratton, who handles the American Mercedes, Car de Luxe and Kissel Kar, has also moved to Boylston street from the quarters he occupied formerly in the building of the Back Bay Automobile Company on Huntington avenue.

WALTER C. WHITE'S EUROPEAN IMPRESSIONS.

Walter C. White, second vice-president of The White Company, has returned from his annual visit to the London and Paris shows. In speaking of his trip Mr. White said:

"Although there is undoubtedly an oversupply of certain types of cars in the European market, the business in White steamers is unaffected. On the contrary, foreign business is growing season by season as the advantages of our distinctive type become more widely recognized. During the last season the White won all three of what are known as the 'desirability contests,' namely, the London Town Carriage competition, the Dust Trials, and the South Harting hill-climb. The latter was primarily an efficiency contest wherein first award was made to the White because it developed at the rear wheels a greater proportion of its assigned horsepower than did any other car, the rating assigned to the White by the Royal Automobile Club, which conducted the test, being 50 horsepower. The prize in the latter contest, by the way, known as the Yellow Trophy, is one of the handsomest I have ever seen. It is a massive gold cup of classic design and some idea of its value may be gathered from the fact that, before placing it on exhibition we insured it for £500 sterling."

EFFECTIVE HOLIDAY WORK OF THE AUTOS.

INDIANAPOLIS, IND., Dec. 30.—At Christmas time the automobile plays a very prominent part in promoting happiness among the unfortunates of the city, in addition to expediting the delivery of parcels for the department stores. In connection with its Christmas charity work, the *Star* this year took the inmates of the Indiana Institute for the Blind to the various charitable and penal institutions of the city to sing carols.

Automobiles were loaned by the Premier Motor Manufacturing Company, the National Motor Car Company, the Indiana Automobile Company, Gibson Automobile Company, Nordyke & Marmon, Hugh J. McGowan, and Louis G. Beschler.

The Indianapolis *News*, each year, from contributions given by the public, purchases provisions and gives them to old and unfortunate people of the city. This year the work of delivering the 200 baskets was done voluntarily by the Premier Motor Manufacturing Company, about a dozen Premier touring cars being loaned for the purpose.

POPE-TOLEDO MAY PARTICIPATE IN GRAND PRIX.

TOLEDO, O., Dec. 30.—From the Pope Motor Car Company the following press notice has appeared:

"It is said there is some talk of the Pope-Toledo all-chrome-nickel steel racer being leased by a French syndicate for racing purposes on the Continent. This is the racing car built by the Pope-Toledo for the 1907 Vanderbilt race, which was postponed. The car was pronounced by experts to be the finest racing machine ever built. While nothing, one way or the other, can be learned from either parties, it is very doubtful if the owners will permit this car to leave America unless it goes to bring home a foreign cup."

The impression prevails that the Pope Company intends to make an entry in the Grand Prix of France, to be held in July next. It will be remembered that Lytle and Dingley were Pope-Toledo racers in the Gordon Bennett race of 1905, and the company has always been greatly interested in speed contests. It is expected in the near future a definite announcement may be made concerning the Grand Prix entry.

PHILADELPHIA'S LATEST BIG GARAGE.

PHILADELPHIA, PA., Dec. 30.—That the financial flare-up has not materially affected the local automobile trade was demonstrated last Thursday, when the first spadeful of earth was turned in digging the foundations for what will be one of the largest garages in the United States. No less than eight buildings now standing at Nos. 229 to 243 North Broad street will be torn down to make room for the improvement. Henry C. Lea is head of the concern which will operate this enormous garage, which will be erected by the William Steele & Sons Company, after plans by Watson & Huckel, architects.

The North Philadelphia Auto Station was last week awarded the local agency for the Garford car. David Sykes and Frank Le Flem are at the head of this concern, which has a garage and salesroom at 3425 North Broad street.

A FOUR-YEAR-OLD AUTO OWNER.

BOSTON, Dec. 30.—It is believed that the youngest owner of an automobile in Massachusetts is the four-year-old son of Dr. George L. Black, of Lawrence, who recently came into the possession of a new Maxwell runabout by holding the winning ticket in a contest run by the Knights of Columbus of Salem.

BRIEF ITEMS OF NEWS AND TRADE MISCELLANY

The Holsman Automobile Company's factory at Chicago was shut down during the holiday week just past, in order to give an opportunity for inventory taking.

The San Francisco branch of the Winton Company is now housed in its permanent home at Van Ness and Grove avenues. This building was erected on plans devised by the Winton people and is one of the best arranged motor car establishments in the West.

The Walden W. Shaw Company, Chicago, are now occupying their new quarters at Twenty-first street and Michigan avenue, where the full lines of the Berliet, Reo and Premier cars are on exhibition. The Shaw company now occupies the most southerly location on the "row" and has one of the finest automobile buildings in Chicago.

Among the prominent American cars on which the Truffault-Hartford shock absorbers are now fitted as part of the regular equipment are the Pierce Arrow, Studebaker, Stevens-Duryea, Stoddard-Dayton, Marmon, Locomobile and Acme—a list of which the makers of the shock absorbers may well point to with pride.

The \$2,500 contest for the drivers of Winton "Six-teen-six" cars will soon be on in earnest, the awards being scheduled for July 1, 1908. The ten drivers who show the smallest repairs on at least 3,000 miles running will divide the money, the first prize being \$1,000; second, \$500; third, \$250; fourth, \$150, and the fifth to tenth, \$100 each.

"Increased sales of high-grade tires and hard times would hardly seem to go together very well," says E. H. Broadwell, "but whatever effect the financial depression may have upon the sale of automobiles, the sales of the highest-priced tires are better now than they were at the corresponding time last year, and the prospects are that they will better throughout 1908."

Manager Frank Eveland of A. G. Spalding & Bros. is very enthusiastic over the proposed spring show to be held at some such place as Morris Park in connection with a race meet, both to be conducted by the New York Automobile Trade Association. "Unquestionably it is the very thing the dealers and the public will want at that time of the year," said Mr. Eveland.

After one of the most strenuous runs imaginable, the White steamer which recently left Chicago with the Stepney spare wheel expedition, arrived at St. Louis. The party consisted of Edward Grant, Edward Van Lunn, L. F. Chaney and a representative of the Chicago Motor Club. Both the car and the spare wheel came through the test in fine style, but the men were exhausted from the exposure.

A new and pleasingly colored hanger just issued by Wheeler & Schebler, Indianapolis, Ind., neatly illustrates the "heart of the automobile" by drawing the bonnet of the auto shown in the picture in heart-shaped form and depicting a Schebler carburetor in gold color on its front. A typical automobile girl with hand grasping the steering wheel is stepping aboard the machine. The design of the whole subject is very effective.

The Jeannin Automobile and Manufacturing Company, 1223 No. Vandeventer avenue, St. Louis, Mo., has been incor-

porated, and commenced to manufacture a two-cylinder motor of the double-opposed type with offset cylinders, especially designed for use in the buggy type of automobiles. Later it is the intention of the company to bring out a small delivery car, and also some other automobile parts. E. P. Fritschle is president; H. W. Jeannin, superintendent, and W. Goener, secretary.

"Keep your motor warm," is the advice of H. E. Coffin, vice-president of the E. R. Thomas Detroit Company. "In the winter weather, when a car is run at speed, the cooling properties of the radiator are much greater than in warmer weather. A motor will run better and start easier if a sheet of cardboard or other light material covers part of the radiator." Mr. Coffin says this advice applies particularly to the Thomas Detroit, the unusually effective cooling system of which is designed to keep the motor cool when run to the limit of its power in the hottest climates.

The Michelin demountable rim, which is being placed on the market by the Michelin Tire Company, is receiving emphatic commendation from autoists at the Importers' Salon this week. The device is so designed that it combines ease of removal with closeness of adhesion—a positive fastening to the wheel rim. The extra rim is carried with its tire attached and already inflated. In case of puncture several bolts are loosened, the old tire slipped off, and the new tire, fully inflated, is slipped on, rim and all. The bolts are then tightened and the operation is complete. The time saved alone is a great factor.

"Whatever may be said about the effect of the recent financial flurry on the sales of pleasure motor vehicles in general," said an official of the Studebaker Company recently, "there is one type of automobile that is receiving more attention than ever before, and that is the electric delivery wagon and truck. Business men are coming to regard this type as a money earner for its owner. Up-to-date concerns all over the country, who have studied the subject of local transportation in all its various phases, are now substituting the electric power wagon for horse delivery; not alone because it gives more satisfactory service, but mainly because it is in the interest of business economy to do so."

One big move that marked the first day of 1908 on New York's automobile row was that of the Rainier Motor Car Company from Broadway and Fiftieth street to its new home on the corner of Fifty-sixth street and Broadway. Although the present Rainier place was built especially for the company a few years ago, it has so far outgrown it that the business had to be distributed through three different buildings. In the new five-story headquarters all this business of salesrooms, offices, garage and machine shop will be gathered under one roof, and the facilities for the company's policy of keeping customers' cars in repair will be greatly improved.

NEW AGENCIES ESTABLISHED.

During the past week three new agencies have been added to the dealers' list of the Franklin Automobile Company, as follows: J. Mount, Red Bank, N. J.; Robert Harmon, Portland, Me.; Guy L. Smith, Omaha, Neb.

The Studebaker Automobile Company has opened a local salesroom in Cleveland for the sale of its electrics. The location is on Euclid avenue near Twentieth street, and Alvin H. Smith, formerly of the Central Automobile Company, will be manager.

The Rambler Automobile Company, Omaha, Neb., has just taken the agency for the Mitchell line of cars, and as buyers in this territory are keen for medium-priced cars that do not balk on the numerous lovely specimens of hills with which the country abounds, the Mitchell cars, which have already shown their ability in this line, will be largely favored.

The Northern Motor Car Company has just closed an agency contract with the Chicago Vulcanizing Company which will put its sign up in Chicago's automobile district in the near future under the name of the Northern Automobile Company. The company will represent the Northern in Chicago, and in the greater part of the State of Illinois. Other Northern agencies just placed are the Oklahoma Motor Car Company, Oklahoma City, Okla.; Humphreys, Schloot & Company, Linton, Ind.; C. J. Layton, Danville, Ill.; H. C. Griesinger, Santa Cruz, Cal.

PERSONAL TRADE MENTION.

H. M. Chambers, who has long been identified with the automobile business in Chicago, has joined the selling force of the Studebaker Chicago branch.

B. F. Blaney, who has been connected with the Corbin Motor Vehicle Company, of Boston, 87 Church street, the Motor Mart, as secretary, has just severed his connections with that concern. His plans for the future will be announced a little later.

Herbert L. Averill, sales manager of the York Motor Car Company, York, Pa., has returned from a week's business trip to Buffalo and the middle west, in the interest of the Pullman. He is one of the official observers in the New Year's endurance run of the Quaker City Motor Club of Philadelphia.

The E. R. Thomas Detroit Company has added to its force W. H. H. Hutton, for five years purchasing agent of the Northern Motor Car Company, and recently manager of the Port Huron factory. He will work in connection with F. O. Bezner in the purchasing department of the Thomas-Detroit factory.

David J. Moreland, for several years field representative of the Rapid Motor Vehicle Company, Pontiac, Mich., has been promoted to the position of superintendent, a position well earned by faithful service and exceptional knowledge of the Rapid line. It is the intention of the Rapid Motor Vehicle Company to greatly increase its output in 1908.

Edgar Apperson, of the Apperson Brothers Automobile Company, of Kokomo, Ind., left last week for a visit to Los Angeles, where he will remain about a month. Though his trip is principally undertaken for pleasure, he will look into automobile conditions on the Pacific Coast very carefully, particularly as they apply to the sale of Apperson cars, while he is in that territory.